

# ESSAYS ON ECONOMICS

BY

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## PREFACE

THIS little volume of essays I can liken to nothing better than an interim report of a commission of inquiry; although the resemblance lies, not in the authority of its statements, but merely in the fact that the essays, like the report, contain the results of the investigations up to the date of issue, and are intended to be embodied, with new matter, in a book of later date. A course of lectures on Economics which I delivered in Sydney last year for the University Extension Board was the origin of the work, some of which is now embodied in these essays. In trying to plan a systematic course on the subject I was driven to so much independent thought in an endeavour to fill up the numerous gaps to be found in all existing text-books that it seemed desirable to publish some of my results. Finding that, owing to my change of profession and contemplated return to Europe, it would be impossible to publish a consecutive

treatise including the whole field covered by my lectures without a delay of perhaps four or five years, I determined to write as much as I could in the short time at my disposal, and to put it in the less coherent form of essays.

The writing of as much as is here offered to the public would have been impossible, had it not been for the enthusiastic assistance generously given me by my friends Messrs. A. Walker and J. Garlick. These gentlemen attended my lectures and took short-hand notes throughout, which they freely placed at my disposal. Without their help, much that is contained in the essays on Labor, Rent, and Production could not have appeared in this volume; and without the aid of their enthusiasm and interest in the subject the task of writing the remainder would have been far harder than it has proved. My feelings of gratitude to them may be imagined from the extent of my indebtedness.

The definite time limit which leaving Sydney imposed upon my labors must be my excuse for the unfinished condition of the essay on Rent, and for the treatment of Exchange and Capital in summary form only. The latter proceeding I can justify only on two grounds: firstly, that the exposition of some parts of the theories of exchange and of capital was necessary in order to put the reader not versed in economic principles in a position to fully comprehend the essays on Rent and Production; secondly, that,



inasmuch as the printed synopses of my Extension Lectures had been somewhat widely circulated, and it was impossible for me to write on these subjects at length, it seemed advisable to reprint the synopses in a form fit for publication, with certain desirable additions and corrections.

Perusal of these essays may lead to the remark that they contain very slight mention of the work of the leaders of economic science. It has been my policy throughout, indeed, to abstain from quotations, and references to authorities, not in the least from a desire to give an impression of originality to my statements, but solely with a view to giving the reader as little trouble as may be in the acquisition of the principles of the science. A few ideas, and several definitions, are original—at least, they have been arrived at by myself independently of written or spoken word; and I may fairly claim that in none of the essays is there any statement of principle which I have not carefully thought out again and again, and thus in some sort made my own. Under these circumstances, in place of acknowledgments in the text, it will be sufficient to record here that the books to which I feel myself chiefly indebted are Pantaleoni's *Pure Economics*, a little book on *Wages* by H. M. Thompson which puts forward advanced and sound views on rent and production, and my father's works—amongst which is to be included the fragmentary *Principles*.

of *Economics*, the proof of which has been before me.

In choosing a style for these essays, the wants of the general reader having a fair education were before me. It has been impossible, however, in treating a subject so closely akin to the natural sciences, to avoid an occasional assumption of knowledge, and not to sometimes use a phrase, which may be unfamiliar to one unacquainted with the physical sciences. The book will undoubtedly be read with the greater ease by those who have had some training in natural science, and particularly in physics.

Prolivity of statement and illustration, which may be tedious, I fear, to the scholar, is not uncommon throughout the essays. It is the outcome of a desire to drive home my meaning with no uncertain hand. An ugly reiteration of certain phrases has been forced upon me by a desire to attain the utmost precision of thought myself, and to help others in the same direction. The bane of economic science in the nineteenth century was looseness of thought and of expression. Authors, with a few notable exceptions, generally failed to obtain consistent and precise ideas themselves; and when they did succeed in doing so, they often stated them in terms which to others admitted of wide interpretation. To the one golden rule of progressive thought—the invention of a new name

for every new idea—I have tried to adhere, though perhaps not with absolute success. I must plead guilty, for instance, to some slight modification of the common meanings of the terms *utility* and *commodity*.

That ambiguous and dangerous term *value* is not used once throughout the essays. Another treacherous word is *cost*, which, in the works of modern economists, is used, without explanation of its meaning, to signify such different things as an amount of *money*, an amount of *utility*, and even an amount of *pain*. It has not been possible to wholly avoid using the word *cost* in these essays, but it is used only in one sense—to denote a sum of *money*. When it might have seemed convenient to use the word *cost* instead of *sacrifice of utility* or *suffering of pain*, I have invariably, for the sake of clearness and reality, chosen the latter phrases. Such words as *value* and *cost* are like cloaks of hasty thought. The author, in seeking the cause of a phenomenon, reaches an idea, finds that it comes within, or close to, the general meaning of such a term as *value* or *cost*, and so writes down the word without that further inquiry which might mean real progress in research.

The use of contractions in printed matter is not a literary custom in England, but, owing to the unavoidable length of some of the technical terms

of economics, it has seemed to me advisable to follow the practice of a few German scientific writers, and make a sparing use of them. For instance, F.D.U. signifies *final degree of utility*, and R.E. means *ratio of exchange*. A contraction of a term which occurs frequently, if made unlike the contraction of any other term, not only saves time in writing, and space in printing, but is in reality much easier to read than the words written in full.

Without following Herbert Spencer to the extent of believing that foot-notes can be avoided altogether, I certainly think the prevalent custom of breaking a sentence with a reference to a foot-note a great annoyance. Throughout these essays, with but two exceptions, the asterisk is placed only at the end of a sentence, and an extra two or three words in the foot-note give the reader its precise application without trouble. Under the present system a foot-note is either passed and forgotten, or it is necessary to begin reading the sentence again after having broken it off and read the foot-note.

In conclusion it should be stated that my friend Mr. Garlick has given me most generous and untiring assistance, both in the revision of the manuscript of these essays for the press, and in assuming sole responsibility for the proofs of the greater part of the book after my departure from Sydney. His professional experience in the handling of literary

matter has been invaluable, and his interest in the subject matter of these essays has led to many keen and fruitful criticisms. It is impossible for me adequately to thank him for his help.

To my wife I am indebted for help in revision of the text and correction of proofs, and to Mr. R. L. Nash, Mr. H. Y. Braddon, and Professor Carslaw, for much information, and a kindly interest in my work.

Sydney,

15th April, 1905.

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# ESSAYS ON ECONOMICS

# I

## INTRODUCTION

### *Principle of Maximum Happiness*

THE motive which underlies almost all the actions of men is a desire to experience pleasure and avoid pain. We clothe ourselves so as to avoid suffering from cold; we eat to stay hunger, and also because the process is enjoyable; and we work that we may provide means in the future of avoiding pain and experiencing pleasure. The upward progress of mankind is a pursuit of happiness. Education, inventions, vast commercial and industrial undertakings, the comfort and luxury of modern life, no less than its worries and anxieties—all these have their origin in man's ceaseless quest for enjoyment, and in his struggle to avoid pain.

If the doings of men be more closely examined, it will be found that each man seeks not only to be happy, but to be as happy as possible; and that he tries not only to reduce pain, but to avoid, as



much of it as possible. A man always does that which, at the moment, appears to him likely to give him the most enjoyment, or to prevent the greatest amount of painful feeling.

When the conditions are such that a certain amount of inconvenience, or even pain, must be endured as the result of experiencing pleasure, as is often the case, we find that a man always endeavours to obtain a maximum of enjoyment for a minimum offset of pain or inconvenience. For instance, a person anxious to enjoy a trip abroad as much as possible tries to accomplish the journey with the least possible discomfort; and he who, to obtain pleasure, must sell one thing and buy another, sells what he cares for least and buys what he wants most. Again, a man who must earn his own living works at such a trade, or for such an employer, as will enable him to gain the greatest reward for the least inconvenience.

The general principle which has just been described, of seeking to obtain a maximum of pleasure, and to reduce pain to a minimum, is conveniently known as the *principle of the maximisation of happiness*, or more briefly (from the Greek) as the *hedonic principle*. The importance of the place which it occupies in the science of economics will be readily understood when it is remembered that, equally in manufacture, trade, or domestic life, this principle is always found to be more

or less consciously at the root of the motives of all men's actions. So wide is it, indeed, in its application to the doings of men, that economists have long been wont to assume that men can be actuated by no other principle. It therefore stands as first premise in every argument used in the science of economics—a fact which it is well to keep steadily in mind. For instance, in economic treatises, whenever it is argued that under certain stated conditions a man will cease working, or will exchange one thing for another, it is always tacitly assumed that the motive of his action is to obtain a maximum of pleasure for a minimum of pain. All actions arising from motives other than the maximisation of pleasure—such, for example, as the refusal of a workman to accept more than what he considers fair pay for work done, or the behaviour of an ascetic who inflicts pain on himself because he believes that there is virtue in suffering as an end in itself—all these actions are at present ignored by the economist. Throughout the sequel, therefore, the assumption will be tacitly made that the ultimate motive of every action discussed is the attainment of a maximum amount of pleasure at a minimum sacrifice.

It will be observed that the hedonic principle contains no reference to the doctrine of self-denial for the happiness of others, which occupies so important a place in religion and ethics. The reason is that the two principles are entirely distinct, and

have no bearing upon one another. The hedonic principle simply states that a man will endeavour to obtain a maximum of enjoyment at the cost of a minimum of pain, when seeking happiness for himself—an act which the highest ethical standard will not preclude his doing at times. Should he be seeking the happiness of others his impulse will be the same. If a group of men be trying to obtain the fullest measure of happiness for one man, for a number of persons, or even for a whole nation, their actions likewise will more or less consciously conform to the hedonic principle. The question how far a man should seek his own happiness, and how far that of others, belongs to the sphere of morals, and lies beyond the scope of economics.

### *Means of Increasing Happiness*

The ways in which man may increase his happiness are numerous and various: intellectual training, religious influence, alteration of moral attitude to life, enjoyment of love and friendship, and gratification of the senses, are some that readily suggest themselves. Mental, moral and religious ways of making men happy are very important—in many respects they are the most important; but they do not fall within the scope of the present inquiry. There will, therefore, be no occasion here to refer to them again. The science of economics is solely

concerned with the last-mentioned method—gratification of the senses. In conformity always with the hedonic principle, man struggles to satisfy his wants with natural objects, or with things rendered, if necessary, more suitable for the purpose by his labor. He makes use of the various objects and forces at his disposal by letting them act upon his organs of sense (eyes, ears, nose, palate, and sensory nerves), in order to produce pleasurable feelings or prevent pain.

To so use the things at command as to maximise happiness and minimise pain is not always easy: it requires care and thought; and often involves complex combinations of effort by many men. During the growth of modern material civilization general methods of obtaining a maximum of happiness with a minimum of pain have been evolved; they have passed an elementary stage, and, more or less unconsciously, have become extremely complicated. These methods have been studied and systematised, and thus has grown up the science which forms the subject of these essays. Economics, then, may be briefly defined as the science which investigates the general methods of man's endeavours to conform his actions to the hedonic principle.

*The Scope of Economics*

Few natural products are, like wild fruit or fresh water, in a condition to be applied directly to the senses: almost everything requires to undergo some transformation, obtained by the application of labor, before it is fit for consumption or use. It does not remain for the economist to discuss the means by which articles are so transformed; that is the province of the various technical sciences, each of which in itself is a study for a lifetime. Economics investigates the general principles of production, and determines what distribution of manufactured articles will be most conducive of the happiness of the individual and of the community. In other words economic inquiry shows how things may be produced with the least amount of trouble; and, once produced, how the greatest amount of enjoyment may be obtained from them.

*Method of Economic Investigation.*

Much literature is to be found enlarging on the method of economic science; the disciples of different schools, the historical, the empirical, and the mathematical, each claiming superiority for their own special methods. In reality the matter is extremely simple, and may be dismissed in a few words. The means employed in obtaining knowledge of the kind

which is called economics is the scientific or 'inductive' method; it is the same method as that used in all other sciences, and indeed, with modifications, the same as that by which knowledge of every kind is acquired. The differences of practice and conclusions in different schools are due to habits of founding arguments on different facts; and also to a more liberal use by some thinkers than others of the deductive part of the method. Students desiring a full discussion of the scientific or 'inductive' method must refer to books dealing specially with the subject,\* but a brief résumé of its main features may be of service here.

All knowledge has its origin primarily in the senses, either directly, or more or less remotely. It is only upon facts which we see, hear, feel, taste or smell that we can found our reasoning, if we wish to reveal truth; because basing a conclusion on opinions, on intuitive ideas, or on the flights of the imagination, is like building a house upon sand—when the searching flood of scepticism comes, it falls. Hence the first operation is *observation*, the systematic use of our senses in obtaining facts.

Enough facts being gathered, the next step is to study them with care, to sort or arrange them in the mind, or perhaps on paper, and seek evidence of ways in which they exhibit resemblance and diversity. A general rule, or *law*, as it is often called,

\* W. S. Jevons: *Elementary Lessons on Logic*; also *Principles of Science*, 3rd edition.

may then be formulated which will express concisely the way in which the facts stand related to one another. This process of correlating facts and expressing them in a concise rule is called *induction*

If two or three laws have been made, or if fresh facts have been observed, a trained intellect is capable of combining two or more laws—or laws with facts—and of deriving fresh knowledge from them by logical syllogism. This process is generally known as *deduction*. The grandest example of deductive reasoning is undoubtedly the science of pure mathematics, in which a vast superstructure of knowledge of the relations of spacial dimensions is erected upon the foundation of a very few observed facts, and a few inductions. The facts, for example, are such as the sum of two and two, or the properties of a right angle; and, as an instance of an induction, there may be quoted that which states that there can exist a line, commonly called a circle, such that every point on it is equidistant from a certain point, its centre.

The process of deduction is one which for its safe application requires considerable training and practice. The majority of mankind have little power of mathematical deduction, and know it, fortunately for science. What so many fail to realise is that they have equally little power of safe deduction in any other branch of knowledge. Thus arises the maze of conflicting opinions in theology and politics,

and in so many other matters that vitally concern the welfare of mankind. If all the facts be correctly observed, there can be but one conclusion logically deduced from them; and this will be reached by all perfectly trained minds, starting from the same facts. The number of different conclusions frequently reached regarding the same question shows either that different facts are taken into consideration, or that the process of deduction is faultily performed. Probably there is failure in both respects.

Workers in all sciences labor under the liability of error in deduction, and means are therefore taken to guard against it. Knowledge deductively gained is put to the test of actual fact by another recourse to observation, the object being to find fresh facts whose existence has been suggested by the deduction, and to see whether these accord harmoniously with the deductive statement. If they do not, the deduction is false, and must be immediately discarded; if they do, it is proved to be true. This process is known as *verification*. A statement derived by deduction is properly known as an *hypothesis* if it has not been fully verified; and it is only called a *theory* when abundant verification has rendered its truth almost beyond question. Unfortunately the meaning of the latter term is frequently abused.

The scientific method consists, in short, of a chain of four mental processes—observation, induc-



tion, deduction and verification. In the exposition of a subject, however, it is by no means often easy to show the different steps by which the knowledge was obtained. This may be done, and as far as possible should be done, in original papers describing important investigations; but in a text-book, where the main object is to state the knowledge obtained in a form in which it will be readily assimilated by the student, this course is hardly possible. Statements of facts and deductions in the order in which they have been obtained might afford excellent mental discipline to the reader; but the frequent change of ideas, and the constant repetition necessary, would repel all but the most patient and tireless students. For this reason the scientific method has little prominence in general works on science, and amongst them in books on economics. The knowledge contained in a book has most certainly been gained by that method; but the facts and statements are re-arranged upon a basis which brings together those most closely related to one another, with a view to rendering more easy their acquisition and retention by the memory.

If the science of economics as expounded in these essays be examined closely, it is easy to see by what steps the knowledge has been gained. Observation has supplied certain fundamental facts regarding man's feelings of pleasure and pain, and concerning the relation of the intensity of these

feelings to the objects with which he is surrounded; and these facts are set forth in the ensuing essays on Pleasure and Pain, and on Utility. The inductions derived from the facts are often expressed diagrammatically by means of curves, and are inextricably mixed up with the statements of the observed facts themselves. Sometimes indeed the facts are omitted as being too well known to be worth stating, and only the induction is mentioned

Good examples of pure deduction are afforded by the hypotheses as to the motives and results of exchange which are to be found in summarised form in the essay on Exchange. These hypotheses are derived by deductive reasoning solely from the inductions concerning the pleasure and pain experienced by man in his relations with material objects which are described in the essay on Utility, in conjunction with the hedonic principle, and the postulate that property is transferable. Verification of these hypotheses is to be found in facts alluded to in the illustrations, and in the descriptive statement of the manner in which exchange is carried on under the actual conditions of life. As they have now been abundantly verified, these hypotheses are stated legitimately under the title *Theory of Exchange*

*Schools of Economic Doctrine*

The question may not unnaturally occur to the reader: how is it, if all knowledge be gained more or less consciously by the scientific method, that there exist so many schools of economic doctrine? Are any of them to be trusted? Setting aside cases in which false conclusions have been reached owing to errors in deduction—and these are not by any means few—inquiry shows that the chief differences between the various schools are the result of their having selected different facts upon which to base their trains of reasoning. Combine with this differing basis of fact the timidity of employing deductive reasoning exhibited by some authors, and the neglect by others of adequately verifying the deductions which they make, and the differences are easily accounted for.

The historical school, for instance, begins by collecting facts regarding the doings of men in the past, and reasons from them, largely neglecting to study the present doings and motives of men, which might be of the greatest value for purposes of verification.

The empirical school visits factories and market places—everywhere collects data and statistics concerning modern industrial life—and induces laws, or general statements, regarding them. Deduction does not take a prominent place in its thought

The hedonic school—as it seems fit to call that which began with Gossen and Jevons, and has Pantaleoni amongst its modern representatives—starts by observing facts concerning man's quest of pleasure and his efforts to avoid pain. By studying man himself in his primal relation to the things and forces of nature, it begins with more fundamental facts than the other schools. The inductions derived from these facts are treated deductively, and the resulting laws are then verified by the criterion of facts observed amongst the complex phenomena of modern commercial life—the selfsame facts, be it observed, which are taken by the empirical school as the material for their first inductions.

Mathematical economists are perhaps hardly to be called a school, because they are recruited from the ranks of both the empirical and hedonic schools. It is now widely recognised that economics, inasmuch as it treats of quantities, whether of feeling or of substances, is susceptible of mathematical treatment; and this statement is true whatever be the basal facts of the primary inductions. Mathematical reasoning is simply an ordered and perfected system of deduction; and, wherever deduction is to be applied to facts conveying a quantitative notion, there may mathematics be used with great advantage by those skilled in its method.

It must not be supposed, however,—and the warning is needed—that the mathematical treatment

of economics is a beginning or an end in itself. The symbolic reasoning of mathematics is like a thinking machine. In skilled hands it provides unerring deductions from the facts supplied to it, but it is not itself responsible for those facts. Judging from past experience, there exists a real danger that mathematical deduction may be too hastily applied to ill-assorted facts, to inductions rendered vague by want of proper definition of the terms in which they are expressed, and even to previous deductions which in reality are themselves false. The non-mathematical reader is very prone to accept the statements of an exponent at home with his *formulæ*, without sufficiently testing the grist which he feeds to his mill.

### *Method and Order of Treatment*

The preceding paragraphs will have given a hint as to the method and order of treatment of the subject of economics adopted in these essays. The fundamental facts upon which induction is based are the feelings of mankind in their relation to the products of nature, and to the material effects of man's labor. The argument is that which is characteristic of the hedonic school, although some attempt is made to apply the process of verification to a greater extent than has been customary with authors of that school. Although symbolic

statement has been avoided for the sake of the general reader, the method of treatment, inasmuch as the subject treats of quantities, is essentially mathematical. Wherever the limitations of words render explanation tedious, recourse is had to geometrical analogies, in the shape of curves and other graphic illustrations, rather than to algebraic forms of statement.

The inherent difficulty of imparting to others a large mass of knowledge in the order of its acquirement by the scientific method has been alluded to already, and no such attempt will be made in this book. The order of treatment selected is that which necessitates a minimum of repetition by grouping in each essay observations, inductions and deductions relating to a particular set of facts. Thus one essay deals with pleasure and pain, another with all that pertains to labor, excepting wages, and another with rent and other facts connected with land. Occasional anticipation of conclusions not yet reached in the order of exposition is unavoidable—as where a knowledge of the law of exchange must be assumed in an essay previous to that devoted to the consideration of exchange, in order to state a deduction principally connected with some such subject as utility or labor. A mere statement of the law is given in anticipation in such cases, its proof being deferred to the proper place.

The arrangement of the essays is in logical sequence as far as possible—that is to say, essays containing statements of fundamental facts and inductions upon which reasoning is to be based come first, and lead up to those dealing chiefly with deductions and their verifications. The essay immediately following this introduction is devoted to a study of the causes of man's pleasure and pain; and the next constitutes an account of the conditions under which things possess utility, or the power of producing pleasure or preventing pain. Then follows a discussion of labor, the means by which man increases the utility of natural products. The next essay, unfortunately only a summary, treats of exchange and of capital—the former a process by which men increase the sum total of utility in their possession by changing ownership of articles which are chiefly the products of labor; the latter involving in the discussion of its origin and purpose the notion of labor, and in the study of the price paid for hiring it, known as interest, a knowledge of the laws of exchange. The subject of the next essay—rent—requires an application of the principles of exchange to the hire of that complex group of commodities which we call land.

The essays up to this point have treated in a general way, more or less applicable to races in all stages of civilisation, of man's efforts to maximise happiness. It would be interesting to have a

number of succeeding essays devoted to a more special analysis of the motives and mechanism of modern industrial life—the refined efforts of civilized man to maximise his pleasure. Unfortunately it has been impossible to include in this book more than one of these—the essay on Production.

The discussion of matters closely connected with industry and commerce usually possesses greater interest than the more abstract considerations which occupy the larger part of this small collection of essays. •The explanation of this fact we may perhaps find in the closer relation with the actual conditions of modern life, and the many pressing social questions, into which such discussion seems to bring us. Yet, just as it is difficult to pick up the threads of a tale in the middle without reading its beginning, so would it lead only to confusion and waste of energy if we were to attempt a mental grasp of highly specialised ideas before we had learnt the general laws which give them their relation. The fundamental ideas of utility and labor, the laws of exchange, and the factors governing rent, all have constant application in the study of the complexities of modern industry and commerce. If the mind assimilate them, they lead like stepping stones to a just understanding of the powerful and seemingly uncontrollable forces which direct the energies of multitudes of men, if they be neglected, the task of putting in mental order the intricate workings of the social organism must baffle the keenest intellect.



## II

### PLEASURE AND PAIN

#### *Man Experiences but Two Kinds of Feeling*

THE feelings of man are of two kinds only: pleasurable and painful. This statement is not often accepted as true upon first hearing; to many indeed it seems obviously false. Considerations which will shortly be discussed will show, however, that if any clear conception is to correspond to the term feeling, the statement must be true. A discussion of the actual nature of feeling, of the physiological action with which it corresponds, would be out of place here; that lies within the domain of psychology, and is, moreover, of no importance in the science of economics. For our purposes it will be sufficient to define feeling as a mental state, a condition of the mind and of the sensory nerves. When a man is thoroughly enjoying himself, no matter how, his brain and nerves are in some state different from that which we call sleep or unconsciousness.

The same can be said of the condition which we denote painful; it is different from unconsciousness and it is different from a state of enjoyment. The pleasurable condition of mind might perhaps be defined as that which man is always endeavouring to attain, and the painful as that which he is always striving to avoid.

The reason why it is usual to associate these two mental states under the one term *feeling* is because they are intimately connected with one another. In a succeeding section it will be shown that pleasure and pain are capable of neutralising one another; so much of the one may obliterate so much of the other. This is indeed a peculiar relation; and as no third state is known which is capable of reacting in a similar way with either of these two states, we are fully justified in asserting that feeling is of two kinds only.

The popular notion that there are many different kinds of feeling most probably arises from the fact that pleasure and pain are caused in a multitude of different ways. Whether a man be playing tennis, drinking, or listening to good music, the feeling produced, so long as he enjoys himself, is all of the same kind, namely, pleasure. Whether he suffer from some bodily injury, from anticipation of some personal calamity, or merely from hard work, the feeling is also of the same kind, namely, pain. The only way in which pleasure and pain can vary, owing to

difference in the means by which they are produced. is in intensity, as will be fully explained in a later section.

### *Economic Definitions of Pleasure and Pain*

By the terms pleasure and pain, a little more is meant in the usage of economics than in ordinary speech. Every sensation which *pleases in the least degree*, from the merest comfort to the wildest happiness, is called *pleasure*. Similarly every sensation ~~which~~ is *in any way uncomfortable or painful*, from the slightest discomfort to the most acute suffering, is called *pain*. A man enjoys his after-dinner smoke, or a brisk walk before breakfast on a cool, breezy morning; a lady may look forward to the possession of a new hat; a small boy may feel satisfaction at the acquisition of a piece of string or a boot-lace; all of us are pleased to be able to sit down when we want, to go out or return home as we like. These things are all pleasures from the economic point of view, however small the amount of enjoyment to be got out of each. In the same way a hard or lumpy bed, a hot sun on one's back, or rough ground to walk over, are things which produce pain, in the sense in which the word is here used; feeling of exactly the same kind, though not so intense, as that caused by a bruise, a headache, or an acute disappointment.

*The Continuity of Feeling*

It is interesting to note that it is difficult to imagine a human being in a state of consciousness ever existing, for more than a moment, without feeling either pleasure or pain, using the words in the sense indicated in the preceding section. The pleasure, or pain, may be exceedingly slight, so slight as to be unnoticeable until the feelings are analysed; but, whenever it is thought of, it is found to be there. The nearest approach to absence of both pleasure and pain might be found, perhaps, in the case of a man sitting in a chair, not tired, but doing nothing. Yet if he does not feel any pleasure in sitting in the chair, why does he stay there? If it is because he can think of nothing to do which would give him pleasure, he probably finds his time irksome whilst merely sitting still, and is really suffering a slight degree of pain. Hence, if he stays in the chair not because doing so gives him pleasure, even of the slightest intensity, he is nearly certain to be feeling at heart a slight degree of pain.

It is only at the moment when pleasure turns to pain, or *vice versa*, that there is in reality an absence of feeling. A person, tired with the preparations for a long journey, first sits down in the railway carriage with a perceptible sensation of pleasure. As he becomes more and more rested,

however, he feels less and less pleasure, until he gradually becomes quite tired of sitting down, and is only too glad to avail himself of a wayside stop to take a stroll down the platform. If he were to analyse his feelings, he would find that just for a moment, when the pleasure of sitting down ceased and his posture began to get irksome, he really felt neither pleasure nor pain.

### *Intensity of Feeling*

It will now be readily understood that feelings of pleasure and pain vary in *intensity*. A pain so slight that it can scarcely be felt is said to have a low intensity: if the pain be felt more and more strongly, its intensity is said to increase; and, if it become very acute, it is said to have a high intensity, or to be very intense. The intensity of pleasure varies in the same way, from low, when a man is enjoying himself but slightly, or is merely comfortable, to high, when he is exceedingly happy. Returning to the illustration of a person taking a long journey in a train, it is evident that the intensity of the pleasure is greatest at the moment when he has just sat down, and realises that the business and worry of seeing to his luggage and catching the train are over. As the train proceeds the intensity of his pleasure becomes less, and at the moment when the pleasure changes into pain its intensity has dwindled to nothing.

During the ensuing time his discomfort grows from nil to something quite perceptible; in other words the intensity of the pain he feels increases. Then it will continue to do, until its intensity is rapidly lowered as he walks on the platform.

The true nature of *intensity* is not always easily understood by those who have made no study of physical or mathematical science. The intensity of pleasure at any moment is perhaps best described as the strength of the feeling of pleasure at the moment. In the same way the intensity of pain is its acuteness. It must be consistently borne in mind that the intensity of feeling has nothing whatever to do with its duration. A pleasure of low intensity does not become of high intensity because it lasts a long time. Intensity is a thing of an instant only, sometimes remaining constant, but more often changing from moment to moment. Perhaps intensity of feeling is best likened to temperature, which may be regarded as intensity of heat. The thermometer will show you the temperature of the air, or the intensity of its heat, at any moment that you choose to look at it. You may watch the mercury in the thermometer rise or fall from hour to hour, but the temperature, or intensity, at any instant is a notion complete in itself, and does not involve any other idea, such as the weight or volume of anything, or an interval of time.

## *Amount of Feeling*

An *amount* of pleasure or pain is quite a different conception from intensity of pleasure or pain. A person may be said to have experienced a certain *amount* of feeling when he has felt pleasure or pain, of varying or constant intensity, *continued for a certain length of time*. Amount, then, is not an independent quantity like intensity, which can vary in one sense only. An amount of feeling depends upon two independent factors; the *intensity* of the feeling, and the length of *time* for which it lasts.

Expressed in scientific language, intensity is a quantity of one dimension, and amount a quantity of two dimensions. Remembering that a length is a quantity of one dimension, and that an area is a quantity of two dimensions, we may usefully liken

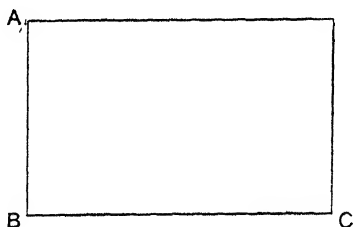


Fig. 1

the intensity of pleasure to the length of a straight line, and an amount of pleasure to the area of a figure. If the figure be a rectangle, as for

example fig. 1, one side AB will represent the intensity of the pleasure, which must be supposed to have remained constant throughout the time it lasted; the other side BC will represent the time during which the pleasure lasted; and the area of the rectangle will represent the amount of pleasure. This indicates the general nature of an amount of feeling. just as the area of a rectangle is the product of its two sides, so is an amount of feeling the product obtained by multiplying its intensity into its duration, supposing the intensity to remain constant throughout. If the intensity is variable the principle is still the same; and the amount is found by multiplying the average intensity into the time; or else by means of the integral calculus.

### *Example of Intensity and Amount of Pleasure*

A perfect understanding of the difference between intensity and amount of feeling is of such vital importance, if progress is to be made in the study of economics, that an example designed to make this difference still clearer will perhaps be of service. Let us consider the pleasure enjoyed by a girl in dancing at a ball—one of the first to which she has been invited, shall we say, so that the novelty has not worn off. The first dance she may enjoy very much indeed: the intensity of pleasure



is then high. The second she may enjoy with equal intensity; but for the third she unfortunately has a partner who does not know his steps, and treads on her toes. For this dance, then, the intensity will be lower, say half what it was during each of the first two dances. The fourth dance might be the lancers, or something which she particularly dislikes, and however practised her partner might be, the intensity of her pleasure might rise no higher than during the third dance. For the fifth dance the intensity might rise much higher again, and oscillate higher and lower during succeeding dances. It is possible, however, that some accident, as a fall, or a tear in her dress, or a truly execrable partner, might, if she were getting tired, lower the intensity of pleasure to nothing, or even beyond—that is to say, might produce some intensity of pain. Recovery would probably soon follow, and pleasure of a moderate intensity would be felt again.

It is obvious that the intensity of pleasure felt by the girl has been varying throughout the ball, and that it would be incorrect to speak at all of the intensity with which she enjoyed the ball as a whole. The intensity at any particular instant might be named, as the intensity at eleven o'clock or at half-past eleven; but if the idea of intensity lasting for a period of time be introduced, we have another conception, a quantity of two dimensions—*amount of pleasure*.

A certain amount of pleasure was experienced by the girl during the first dance which was very much enjoyed; and, since the intensity of pleasure was assumed to remain constant throughout the dance, the amount of pleasure which she enjoyed must be proportional to the length of time for which the dance lasted. Suppose that each dance lasted ten minutes, and that we neglect the intervals between the dances. We may then draw a number of rectangles to represent the amount of pleasure

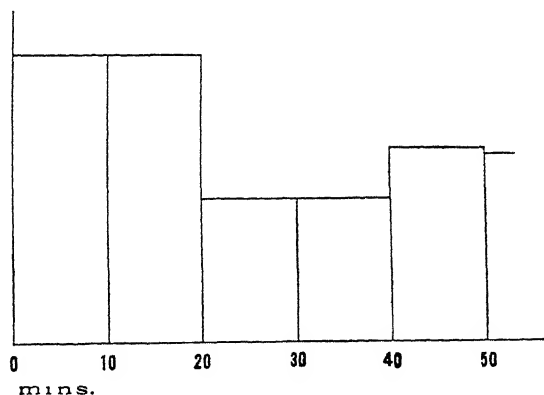


Fig. 2

enjoyed during each dance, as in fig. 2, the base of each rectangle being taken to represent ten minutes, and the height of each being made proportional to the intensity with which the dance was enjoyed. It is obvious from the figure, that the amount of pleasure enjoyed during each of the first two dances

was the same, since the area of the first two rectangles is the same. It is also evident that the amount of pleasure derived from the third and fourth dances together is only half what was derived from the first two, because the intensity is only half as great. Further, since the area is proportional to the amount of pleasure, we learn that the third dance produced but half as much pleasure as either the first or second separately, and but a quarter as much as the first and second taken together; also that the third and fourth dances taken together gave exactly as much pleasure as the first or second taken separately.

It should be clear that an amount of pleasure may be increased either by increasing the time during which pleasure of a given intensity lasts, or by increasing the intensity of a pleasure which lasts a fixed time. Both intensity and time may be increased or diminished together; or one may be increased and the other diminished. In all cases the *amount* of feeling enjoyed is the product of the time and the intensity.

### *Opposite Character of Pleasure and Pain*

The real relation of pleasure and pain to one another can now be explained. The one is the antithesis of the other, its direct opposite. The

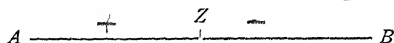
two feelings are so related that so much of the one may compensate or destroy so much of the other, just as a quantity of acid neutralises its equivalent of alkali. This compensation is continually taking place whenever pleasure and pain are felt at the same time, and a man's actions are swayed by the feeling which predominates in intensity. For example, let us suppose that a party of friends has arranged to go to the theatre one evening. One of them is unfortunately suffering from toothache that night; hence, at the same time that he is experiencing pleasure from seeing the play he is also suffering pain. If the toothache be not severe, or the play be exceptionally good, the intensity of the pleasure may be so great as to more than counterbalance the intensity of the pain, and the net result is then a feeling of pleasure of diminished intensity. On the other hand, if the acting be bad, or the toothache very severe, the pain may overbalance the pleasure, and the net feeling is then pain of a certain intensity. The man's action in the two cases is governed by the nature of the surplus feeling; in the former case he would remain at the theatre, in the latter he would probably leave and seek relief at a chemist's, or in the grateful indulgence of a sleeping draught.

The relation between pleasure and pain may be very similarly expressed in the language of the

mathematician. If pleasure be regarded as a positive sensation, pain may be regarded as its negative.\* Quantities of the same kind, but of opposite sign, when their effects are combined, are added algebraically to one another; and their sum is obtained by subtracting the less from the greater, and giving it the sign of the greater. Thus if a train be moving at the rate of +15 miles per hour, and a man run down its corridor at the rate of —5 miles per hour, that is to say, in the opposite direction to the motion of the train, his actual motion is the sum of the two, or at the rate of +10 miles per hour.

A numerical illustration of the addition of pleasure and pain is not so easily given, because as yet no unit has been devised by which intensity of

Readers not familiar with the mathematical use of the terms positive and negative may be informed that they are simply names for opposite directions from a starting point, which is called zero. Thus if we take any straight line, such as AB in the annexed figure, and place our starting point, or zero, anywhere in it, as at Z, then if we call all lengths measured from



Z to the right positive, we may call all lengths measured from Z to the left negative. It does not matter which direction is first chosen as positive, but the opposite one is always negative. Such a conception as intensity of feeling is of course not in itself a length, but an intensity is always capable of being represented by a length proportional to it, because both are quantities of one dimension. As there are two opposite kinds of feeling, and their intensities may be represented by the lengths of lines drawn in opposite directions, they may be very properly and conveniently distinguished as positive and negative feeling

feeling can be measured. It is easy to conceive of the existence of such a unit for any one person; but the units would be different for different people, because in the present state of psychological science, it is impossible quantitatively to compare the feeling of one person with that of another. Such algebraic addition of pleasure and pain does, however, very commonly take place in daily life, more or less unconsciously, and without the use of any unit of measurement of intensities of feeling. Is it worth while, a man asks himself, to take this extra piece of work just offered me, in order to make money enough to travel abroad during my coming holiday? He tries to estimate whether the pain produced by the extra work will be more than counterbalanced by the pleasure anticipated from the travelling. Upon whether the preponderance of anticipated feeling is pleasurable or painful, positive or negative, depends his acceptance or refusal of the work

In the light of the more exact statement now given of the relation of pleasure and pain, the example previously given\* of the change of feeling of a man sitting in a train, will be better understood. His feeling on first sitting down in the train is positive, and of high intensity. As the train proceeds the intensity of positive feeling falls,

and continues to fall until it reaches zero. It does not remain at zero for more than an instant, however, but immediately passes over to the negative side, and increases in intensity until the man steps out on the platform. Then the intensity of negative feeling, or pain, decreases; and, passing through zero, the intensity becomes positive again, as the man once more becomes comfortable.

### *Three Causes of Pleasure and Pain*

The means of attaining a maximum of happiness will not be easily understood unless the different ways in which pleasure and pain are produced stand clearly before the mind. Three distinct ways are recognisable in which pleasurable or painful feelings may be caused:—

- (1) By the memory of past events;
- (2) By sensation of present events;
- (3) By anticipation of future events.

It is the commonest experience of life that pleasure or pain remains as the legacy of every pleasurable or painful occurrence, whenever the thoughts recur to it. The intensity of feeling, whether pleasure or pain, produced by the memory of past events is proportional to the magnitude of the pleasure or pain remembered; and further, it diminishes as the time elapsed since the event occurred increases. A long and particularly pleasant

holiday, for instance, causes a stronger afterglow than a short one, or one spoiled by the weather, for the amount of pleasure is greater; also, as the years pass by, there is a falling off in the strength of our reminiscent pleasure, due to the lengthening interval of time since it was experienced. It is manifest that pleasure or pain derived from memory of the past can in no wise be altered, except by an effort of will directing the thoughts. It does not therefore properly fall within the scope of economic study; and no further reference need be made to it.

Further consideration of pain will be conveniently postponed until the causes of pleasure have been examined somewhat more closely. The following pages will therefore be devoted to an analysis of the causes, firstly, of *present pleasure*, as we may shortly call pleasure due to present sensation; and, secondly, of *anticipal pleasure*, or that produced by the anticipation of future pleasure.

### *Causes of Present Pleasure*

Present pleasure is produced by very many actions and events which give rise to sensations. The use of certain articles, the hearing of pleasant sounds, the seeing of pleasant sights, are all means of creating pleasure. For instance, a man possessing a bicycle experiences a certain amount of pleasure whilst riding it, unless he is using it for business



purposes; he may also enjoy drawing the smoke of burning tobacco through a pipe, or simply sitting in a comfortable chair. Consumption of food and drink, or the burning of fuel for the sake of warmth on a cold day, are common sources of pleasure.

### *Difference Between Use and Consumption*

It would be possible to make a complete classification of material objects and forces with regard to the manner in which they affect the senses; and, with the progress of economic science, it will doubtless become important that such a classification should be made. For an understanding of the main principles of economic theory, however, it will be sufficient to divide articles which afford pleasure broadly into two groups, those which are *used* and those which are *consumed*. A thing is said to be used if it suffers no loss of material as the result of pleasure being derived from it; on the other hand it is said to be *consumed* if the derivation of pleasure entails the loss of the whole or part of it. A type-writer, a tea pot, a watch, a horse, a book, clothes, machinery; these are all usable articles. Coal, ice, tobacco, paint, matches, food and drink, are examples of substances which give pleasure only if consumed, or their consumption be anticipated.

This simple classification of all natural and artificial products makes no pretence to exactitude; a moment's consideration will call to mind a hundred things which cannot be strictly said to be either perfectly usable or perfectly consumable. Every kind of machinery is subject to wear and tear, which in time renders it useless; almost everything that is used suffers some deterioration in use.

A few really usable articles can, however, be thought of. The crockery from which we eat and drink is practically free from wear, and might well be used for hundreds of years, apart from accidental breakages, which are not to be accounted either as use or consumption, but simply as *loss* of so much pleasure-giving property. Perhaps the most perfectly usable articles are those which we use by simply looking at them, or through them. Frescoes, statues, or stained glass windows, spectroscopes, or opera glasses, might serve their purposes for thousands of years, if carefully guarded and preserved from the effects of the weather.

Again many articles are partly consumable and partly usable, because a certain quantity must be present or none of it can be consumed, at least in the ordinary way. A piece of soap or a lead pencil is consumed; but in either case the shape and size of the article are made use of in holding it. Cut

in reality they are used, because any number of people may look at them. They rapidly deteriorate, however; that is to say, they quickly lose the power of giving pleasure.

It is advisable to use the terms consumable and usable with as much precision as possible; but, owing to the existence of so many articles whose properties do not accord with the ideas properly associated with either of these terms, it is at present necessary to somewhat stretch the meaning of one of them, so as to embrace all intermediate articles. Since the consumable articles by nature are more sharply marked off from the rest than are the usable articles, it will be convenient to define the former precisely, and to rest content with a negative definition for the latter. A *consumable article*, therefore, may be defined as one of which the portion actually employed to give pleasure is completely destroyed during the act of obtaining the pleasure—destroyed, that is to say, so far as its power of again giving pleasure by the same mode of consumption is concerned. Every other kind of commodity, even if it wears out so rapidly that it is only capable of causing pleasure a few times by the same method, may be conveniently spoken of as *usable*; and that is the practice which will be adopted throughout these essays. It may be noted, however, that for certain purposes, when having regard to long intervals of time, it will be

convenient to consider articles which rapidly wear out as consumable. Wherever this different point of view is adopted the fact will be explicitly stated. In general, such things as gloves, hats, ties and other articles of clothing which rapidly spoil with use, are nevertheless to be called usable, the term consumable being confined to such as are necessarily destroyed the first time they are applied to the production of pleasure.

### *Periods of Use and Consumption*

Very few articles are continuously consumed or used by man. Air is probably the only substance which man can continually consume, and it is necessary that he should do so in order to avoid pain. A person living in an arctic climate may consume heat without intermission, but he is obliged to divide his consumption of light into periods by closing his eyes. The use of certain things, such as a house, a book-case or a watch, is almost continuous; but the vast majority of the objects with which man surrounds himself are intended only for occasional use. The use and consumption of almost all articles, then, is divided into *periods*; but these vary very much in length. Periods of consumption of food commonly last from about twenty minutes

to one hour; a bicycle ride may last from half an hour to ten or twelve hours, drinking a cup of coffee takes five minutes, the striking of a match as many seconds, whilst the use of a country cottage for a holiday may extend to several weeks.

### *Law of Satiation.*

If the reason be sought why use and consumption take place in periods and not continuously, it will be found in the fact that the intensity of pleasure derived from any one action does not remain constant, but in each period decreases ultimately to nothing. It is the commonest experience of life that man's appetite for pleasurable sensation of any one kind is easily satisfied by the continuance of that sensation, to read a novel, for instance, is enjoyable, but after an hour or two it palls on one: the ear tires of even the best music at the end of a long concert; and the act of smoking, if unduly prolonged, produces no pleasure. In short the appetite for every single means of obtaining pleasure is more or less rapidly satiated.

With the gradual satisfaction of the appetite for a sensation there goes a corresponding fall in the intensity of the pleasure which it produces. The intensity of pleasure is generally greatest at

the beginning of a period, or very soon after; and it then decreases more or less rapidly, possibly with a few ups and downs, until it disappears. When the intensity has fallen to zero, the particular kind of use or consumption enjoyed during the period is stopped, for there is no object in continuing it when it no longer gives pleasure. This universal principle of the satisfaction of appetite, and the corresponding fall of the intensity of pleasure to zero, is conveniently known as the *law of satiation*.

### *Examples of Periods of Consumption*

#### *Eating a Meal*

As a detailed example of the fall of intensity of pleasure during a period of consumption, we may take an instance which will be familiar to everyone—an evening tea or supper after a long day of healthy out-door exercise. Let us suppose that the first few mouthfuls of the meal satisfy somewhat acute pangs of hunger, and therefore cause intense pleasure. As feelings of absolute hunger give way to a healthy appetite the intensity of pleasure becomes less, though still high. As the meal is continued the intensity gradually falls;

and only when the intensity of pleasure has fallen almost to nothing is eating stopped.

The manner in which the intensity of pleasure falls may be easily shown by means of a curve. In fig. 3 let time be measured from left to right along the horizontal line  $OX$ , the divisions representing intervals of a minute, and the point  $O$  being taken to represent the moment at which the meal was begun. Also, let some arbitrary

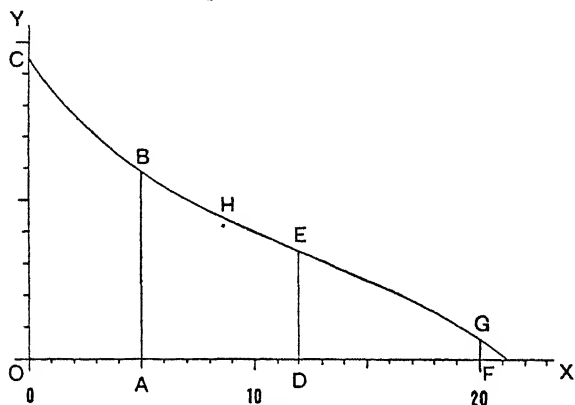


Fig. 3

scale of intensity be imagined, and set off on  $OY$ . The intensity of pleasure at any instant may then be shown by the length of a line measured vertically upwards from the point on  $OX$  corresponding to that instant, its length being made proportional to the intensity at that instant. For instance, after 5 minutes, shown by the length

OA, the intensity of pleasure might be such as would be represented by AB, if the intensity at the start were shown by OC. After 12 minutes the intensity might be represented by the line DE, and after 20 by the line FG.

It is not necessary always to draw an actual line to represent the intensity at any particular moment, a point, such as is shown by the little dot at H in the figure, is quite sufficient. The point H being set to the right of OY a distance corresponding to 8 minutes, and a distance vertically above OX corresponding to the intensity of pleasure at the moment it represents, the position of the point tells us quite as much as would a vertical line.

Let us suppose, now, that the intensity of pleasure were determined at intervals of a few seconds throughout the whole meal. The corresponding points marked on the figure would nearly form a continuous line. If the intensity were measured every instant, continually in fact, the resulting record on the diagram would be a continuous line. The points would have become so close together as to form a line. Any such line is called a curve, and the curve drawn in this manner in fig. 3 shows with clearness, to anyone who understands the principle of its construction, how the intensity of pleasure derived from



consumption of a meal varies with the time. In other words, the curve shows what the intensity is at each and any particular moment throughout the meal \*

A little introspection will show, however, that a perfectly steady and continuous decline of intensity must be a rare occurrence. Usually the mere appearance of some favourite dish will raise the intensity of pleasure, and it will be still further raised when the dish is tasted; but it soon commences falling again. It might even be argued that each drink causes a momentary rise of the intensity of pleasure.

The change of intensity at the beginning of the meal has not yet received close attention. It is hardly likely that there is ever an absolutely instantaneous jump upwards of the intensity of pleasure at the moment when the first portion of food enters the mouth. The intensity will have been rising gradually from anticipation, perhaps for

\* Curves will be used frequently throughout the book by way of illustration, and the reader will do well, if he be not already familiar with the meaning of curves, to make sure that he thoroughly understands their construction and interpretation before passing this point. A further explanation of curves and their mathematical significance is to be found in Hall's *Graphical Algebra* (2nd edition. Macmillan, 1903), Wickstead's *Alphabet of Economic Science* (Macmillan, 1888), or in works on the Differential and Integral Calculus

some time beforehand; and, as the food is actually being conveyed from the plate to the mouth, the intensity will rise very rapidly, till it reaches the point determined by the taste of the first morsel.

The curve which may be drawn as a result of this detailed analysis is shown in fig. 4. As before, distances measured to the right from O represent time, whilst vertical lengths represent intensity of pleasure. It is not necessary to insert the actual

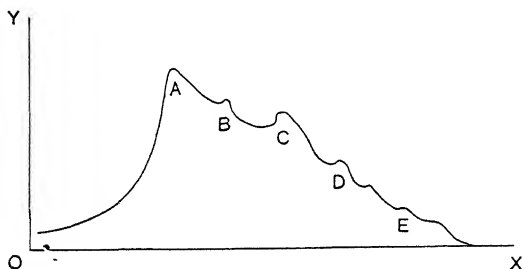


Fig 4

scales of minutes or intensity of pleasure, as these can easily be imagined. The curve rises slowly at first, owing to anticipation, and then faster, until the highest point A is reached at the moment when the food is first tasted. A continuous decline then follows, with a few interruptions: the smaller of these, as at B and E, mark drinks; the larger, at C and D, denote the commencement of new dishes.

*Other Illustrations*

The illustration just described was chosen because it is one which must be familiar to everyone. Any other kind of enjoyment, aesthetic or passionate, would give rise to a similar curve: and this is equally true whether the pleasure be produced by use or consumption—by visiting a picture exhibition, for instance, which is a case of use; or by less elevating forms of amusement, such as drinking and smoking. In all these cases the curves have the same general form, and differ from one another only in details.

A few more illustrations may not be without interest; and a case of what is often spoken of as aesthetic pleasure will be considered first. In this connection it is important again to emphasise the fact that there is but one kind of pleasure, however it may be caused, and but one kind of pain. Pleasure is only positive feeling with a certain intensity; and it is the variety in the nature of the sensations, and the use of different nerves, which distinguishes what are generally called different kinds of pleasure from another.

*Listening to a Concert*

The pleasure experienced by a musical person attending a concert will repay study for two

reasons: because the intensity of pleasure, though generally tending downwards, may show marked rises; and also because, listening to music is a case of consumption of a peculiar article—one which is lost as fast as it is produced. The curve (fig. 5) shows the variation of the intensity of the listener's pleasure throughout a concert consisting of seven pieces, numbered I. to VII. The curve rises slowly at first, and then faster owing to anticipation; then it falls a little as the first piece

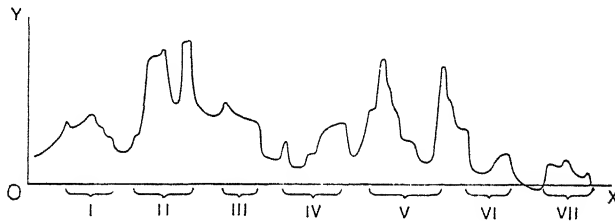


Fig 5

begins, owing to the opening not coming up to the hearer's expectations. Then as the music improves the pleasure curve rises, only to fall off again towards the end of the piece, and to sink suddenly when the applause begins. Towards the end of the interval which follows the pleasure of anticipation increases, as the listener knows the next to be a work he likes. After a slight pause when the music actually begins, his expectations are more than realised, and the curve shoots up.

A tiresome passage causes a sharp drop, which, however, is followed by a rise to the highest point yet reached. Then there is a slow fall of intensity during the succeeding interval, whilst the afterglow of pleasure slowly dies away. The third item on the programme is short, and though it begins fairly well, it is not by any means so pleasing as the preceding piece. The remainder of the curve will explain itself; and it is only necessary to point out how the average height of the curve tends to fall, in spite of the great irregularities. The decline is of course due largely to the gradual satisfaction of the desire to hear music, but also partly to a growth of bodily tiredness, owing to the discomfort of sitting in a chair, perhaps none too easy.

### *Complex Periods of Consumption*

The examples hitherto considered have been of a somewhat complex character. The food consumed at a meal is not all of the same kind, nor is the music of a concert all equally enjoyable for any one person. Strictly speaking, in these cases a great number of distinct periods of consumption of different articles follow one another very rapidly, short periods of consumption of the same article, as tea or coffee, being repeated, but starting each time with less intensity than before.

*Simple Case—Boy Eating Chocolate*

The change of intensity of pleasure, during a period of consumption of what is strictly one simple article, may be ascertained by considering such a case, for example, as a boy eating chocolate. In this case the intensity of pleasure will rise at first gradually, owing to anticipation, as shown in

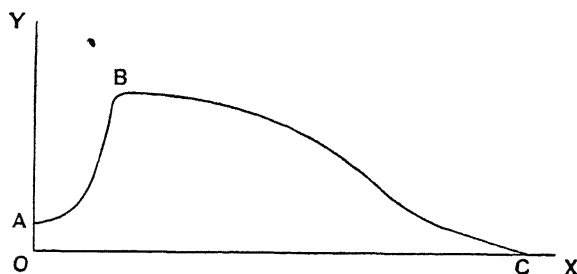


Fig. 6

the curve fig. 6, and then very rapidly, as the taste of the first morsel is realised, to a maximum at B. Thereafter it falls, at first slowly, perhaps, as the taste does not tire easily; and then faster for a while; and towards the end probably more slowly. The point of interest is that, whilst the rate of decrease of intensity may vary a little, the intensity is yet continuously decreasing, from the moment the first portion is tasted, giving rise to a smooth curve.

*Intensity in Relation to Quantity Consumed**Boy Eating Cherries*

Consumption may also be studied from a different point of view from that which has just been discussed—namely the variation of intensity of pleasure, not with time, ~~but with quantity of substance consumed~~. Here again the intensity of pleasure during any period will tend to diminish, becoming less and less for each successive portion consumed, until it reaches zero for the last portion.

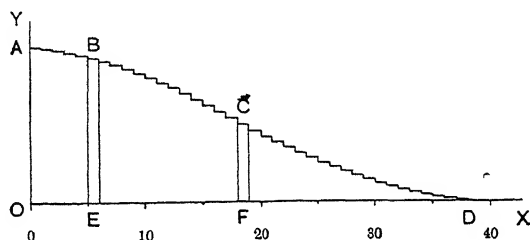


Fig. 7

An apt illustration is supplied by the feelings of a boy eating cherries, graphically represented in fig. 7. As before, vertical distances represent intensity of pleasure; but in this case horizontal lengths measured to the right from  $OY$  represent quantity consumed. The scale on  $OX$  indicates the number of cherries consumed, and a vertical column set over the space representing any

particular cherry is made proportional to the intensity of pleasure which it caused when being eaten. Thus the intensity produced by the sixth cherry is represented by the column EB, and that produced by the nineteenth cherry by the column FC. If columns were erected thus for every cherry, and the unnecessary vertical lines omitted, a stepped curve such as ABCD would result.

### *Examples of Periods of Use*

#### *Sitting in an Armchair*

As an example of pleasure derived from the use of something, an armchair is an article which readily suggests itself. Unless one is exceedingly tired, the intensity of pleasure derived from sitting

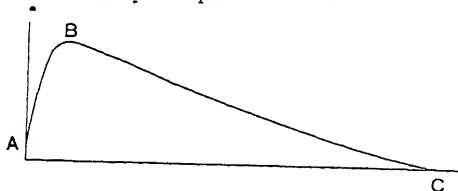


Fig 8

in an armchair is not very great; but yet in each period it falls off continuously in exactly the same way as in a simple case of consumption. The pleasure due to sitting in a chair is usually added to pleasure resulting from something one is doing



whilst there, but, if the two could be separated, the intensity of the former would probably vary as is shown in the curve ABC, in fig. 8.

### *Playing a Piano*

The pleasure derived from playing a piano might be shown by the curve ABD in fig. 9, the rises marking particularly interesting or enjoyable passages. It is a question whether such actions

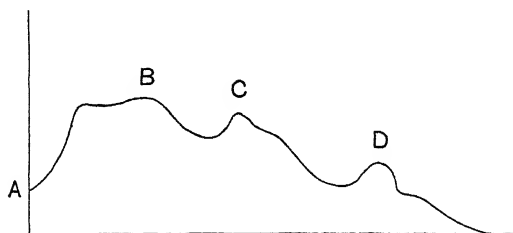


Fig. 9

as playing a musical instrument ought not to be regarded as combinations of consumption of the sounds produced, with use of the instrument. The mere mental and physical exertion of playing is capable of producing pleasure, as well as the resulting harmonies, which can be heard equally well by another listener.

### *A Bicycle Ride*

Still another case, that of a bicycle ride, is illustrated in fig. 10, in which the sudden falls of intensity, as at C and E represent the toil of

climbing hills, whilst the equally sudden rises following them, at B, D and F, show the pleasure due to coasting down the further sides of the same hills. The depression GH is due to the traversing

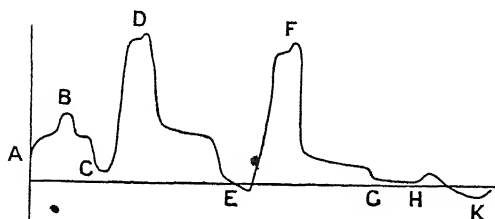


Fig 10

of a rough section of road. The curve twice falls below the zero line, showing that pain was experienced; this was due at E to the hill-climbing, but at K to the cyclist getting tired, although on level ground, by the distance he had travelled.

### *Use of Articles Which Ward Off Pain*

The examples which have been quoted are all cases in which a strong intensity of pleasure, and a marked change of intensity, are easily recognisable. The majority of our daily actions, however, result in pleasures or pains of such slight intensity, that attention requires to be directed to them if they are to be recognised at all. Wearing a hat does not give one any distinct sensation of pleasure, unless perhaps the hat be one of particularly

ornamental design; the real use of the hat is to ward off pain. When a hat is once on, its presence is apt to be forgotten, until continued use of it begins to create some feeling of discomfort — economic pain. Use of a hat would be discontinued when the discomfort attending such use exceeded the discomfort which might be expected from discontinuance of its use, *i.e.*, from taking it off. A hat would thus be worn longer in the rain or under a hot sun, than on a warm and fine, but cloudy day.

In any such case the intensity of positive feeling derived from use or consumption can only be measured by the intensity of the painful or negative feeling which, at the moment, it is supposed is avoided by the action. The greater the pain which is thought of as warded off, the greater the satisfaction derived from the contemplation of the fact that it is avoided. Boots, almost all articles of clothing, and a large number of other things in daily use, afford pleasure in the same way.

The representation by curves of the intensity of feeling due to such actions presents some difficulties, but an attempt has been made in fig. II. Remembering that pain is to be regarded as the negative of pleasure, we may represent intensity of pain by distances measured vertically downwards from OX, that is, in the opposite direction to that which represents pleasure. As a case in point, let

us consider the feelings of a man who puts on an overcoat on a cold morning. He supposes that if he did not wear it he would suffer a certain degree of pain, and he probably makes a rough mental estimate, before he puts it on, of the intensity of pain which he would suffer throughout the day, if he were to be without the coat. Let his estimate be represented by the curve ABC: it shows the intensity greatest in the morning and evening, and very slight in the warmer part of the day. Now,

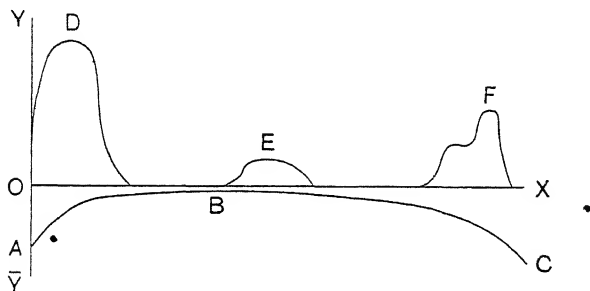


Fig 11

by putting on the coat when he sets out, he neutralises the pain which he was suffering at the moment, from anticipation of feeling cold, and use of the coat may thus be said to have produced an amount of pleasure equal to the pain which it has neutralized. To neutralize nearly all the anticipated pain of the day during the first few minutes of wearing the coat the intensity of pleasure must be great, as at D. Afterwards his thoughts will only

occasionally revert to the fact that he is wearing a coat; but, whenever they do, he will experience pleasure from the thought that pain has been avoided, as is represented by the rises at E and F. At other times his feelings, whether of pleasure or of pain, will not depend at all upon the use of the coat, and consequently no intensity of pleasure at all is shown for such times on the curve. It must be borne in mind that the lower curve ABC does not represent pain actually felt throughout the day, but only what the man, before he put the coat on, estimated would have been felt without its use. The two curves are therefore on a different basis, and have only been put in the same figure to save space.

### *Intervals Between Periods of Use and Consumption*

Periods of the same kind of use or consumption are often repeated again and again at longer or shorter intervals. Meals, for instance, are partaken of at intervals varying from three to six hours, if the time allotted to sleep be neglected; a bed is used once a day; whilst many articles, such as a tennis court or a billiard table, may be used at quite irregular times. It is a familiar experience that the intensity of pleasure obtaining throughout any one period of use or consumption usually differs from that

felt during other periods of use or consumption of the same kind. Lunch, for instance, is perhaps begun with more pleasure than breakfast; or cricket is played to-day with more zest than it was a week ago. A bath becomes a luxury to a person who is obliged for a few days to go without one; and a drink of clear cold water, though affording little pleasure when it is the usual beverage, acquires a new charm for anyone who has had to depend a while on manufactured drinks.

The great difference in the intensity of pleasure obtained at different times from one and the same physical action is probably due to a variety of causes. Sometimes it is no doubt the result of a difference in the state of the mental or bodily health of the subject; at other times it may be accounted for by varying conditions of external circumstances, such as the state of the weather, or the number of people in one's neighbourhood. In the majority of cases, however, it may be confidently ascribed to the fact that man's taste for any particular kind of pleasure is easily satiated. As has been already stated\* a person's taste is more or less satisfied at the end of each period, and it then requires an interval of rest for recovery. The longer the time of abstinence from pleasure derived from a particular action, the stronger becomes the appetite

\* See page 38.

for feeling such pleasure, and the greater the intensity of pleasure experienced when it is indulged. This generalisation may be briefly called the *principle of recovery of taste*.



Fig. 12

An illustration of the foregoing principle is given in fig 12, which represents three successive periods of use or consumption. Attention may be fixed by supposing the action to be cycling, or smoking, or playing tennis; but it matters not what it is, because the principle applies equally to all kinds of actions—there would be differences only in the shapes of the curves, and the scales on which they are drawn. As before, let vertical lengths represent intensity of pleasure, and distances measured horizontally from OY represent time. The first curve, of medium height, may be taken as representing the intensity of pleasure after a normal interval. The second period follows after what we may suppose to be an unusually short interval, and the intensity is, therefore much less; whilst the third period is preceded by an abnormally long space of

time, which accounts for the pleasure being very intense.

### *Long Continuance of Pleasurable Feeling*

It should be noted that the law of satiation, and the principal of recovery of taste, do not refer to the feeling of pleasure itself, but merely to the mode in which it is produced. A continual change of sensations is necessary for sustained enjoyment, one kind being enjoyed whilst the senses rest from another. The assumption would be unjustifiable, however, that a permanent continuance of a high intensity of pleasure is possible, even if it be caused by a variety of different actions. Persons whose lives are an almost continuous round of pleasure-seeking occupations appear to derive but little intensity of pleasure from what they do, their desire for pleasure becomes more or less satiated, because their enjoyment is not separated into periods by intervals of pain, using the word in its economic sense, which would allow their appetite for pleasure to recover. Thus large portions of the lives of such persons form single periods in which the intensity of their pleasurable feelings is always slowly decreasing. The analogy is worth noting, which subsists between this induction regarding satiation with pleasure in general and that other, the law of satiation, which refers only to the pleasure derived from a particular action.



Looking at the matter broadly we may possibly discover a kind of compensation in the feelings of man. Those persons who experience pleasure so constantly as to become more or less satisfied in their desire for it, for that very reason probably feel pain the more acutely when it comes. On the other hand, it is not unlikely that continuance of pain may bring some mitigation of its intensity, through the senses becoming deadened. We may well believe, therefore, that enjoyment with the highest-intensity is the privilege of those whose pleasure is broken into reasonable periods by intervals of toil or trouble. The automatic tendency to compensation would appear to be so complete, that, in the individual lives of the majority of the men and women, the algebraic sums of pain and pleasure probably differ by much less than is frequently supposed. At the same time there are undoubtedly persons, who, whether from peculiarities of temperament or of circumstances, lead unusually happy, or exceptionally painful lives.

*Relation of Quantity Used or Consumed to  
Pleasure Produced*

Things differ in the quantities of them which must be used or consumed to produce equal amounts of pleasure, a fact which, perhaps from its very obviousness, has usually not received the attention

it deserves. For instance, it might require a whole loaf of bread to give a small boy as much pleasure as he would derive from one stick of chocolate, the former weighing perhaps twenty times the latter. More sugar is required for the table than salt or pepper, though we satisfy ourselves with each, and to create a certain amount of pleasure by heating or cooking requires, under normal circumstances, a weight of coal greater than the weight of oil or gas necessary to produce the same amount of pleasure by supplying light. The contrast in the weight required to produce the same amount of pleasure is still more striking in the case of usable articles, a fountain pen may be as useful as a chair; and a lady may derive just as much pleasure from a diamond ring, weighing perhaps an ounce, as from a bicycle, some thirty pounds in weight.

Although the general principle just stated is perfectly clear, serious difficulties present themselves if a detailed study is attempted. The question arises at once: How are different amounts of pleasure to be compared or measured? The comparison might, perhaps, be made by anyone for himself, after a little practice at introspection, but of course it is quite impossible to compare amounts of pleasure in different persons. Again, in different periods of consumption, and throughout the same period, the amount of pleasure produced by unit quantity of the ~~commodity~~ is nearly always different, hence an

average of many periods would have to be taken to compare one commodity with another. The result would be that, whilst we might discover the quantity of each commodity on an average necessary to produce one unit of pleasure for a particular individual, such quantities would not hold for any other individual. The question is one, therefore, which will require a more extended investigation than can be given to it here, but which nevertheless promises results of interest to anyone who will undertake it.

This *principle of unequal quantities*, as it may be called, is here mentioned chiefly in order to draw attention to its influences on the prices of the staple articles of consumption, when these, as is usual, are sold by weight. The great difference in the prices of foods per pound—tea 1s to 2s, sugar 2d to 3d, potatoes  $\frac{3}{4}$ d, vanilla pods 7s, saccharin 35s—is partly due to the fact that quantities, approximately in the inverse ratios of the prices, are required to produce equal amounts of pleasure in the average man. When supply is adjusted to demand, under stable conditions, and in the absence of monopoly, the prices of articles in general demand are determined by cost of production. But the cost of production per unit weight depends on the amount produced—for the greater the quantity made by a factory the cheaper is the cost of production per pound. Hence those articles of which much must be consumed to

give one unit of pleasure, must be manufactured on a much larger scale than those of which little is required, if the demand is to be met. The result is that the former (those articles largely consumed) are cheapened relatively to the latter, in the proportion of the cost of production on a large scale to the cost of production on a small scale.

The quantity of an article used or consumed per unit of pleasure is only one of the minor causes which help indirectly, through influencing demand, to determine the prices of articles in general use; but it is of sufficient importance to make its action worth understanding. A somewhat idealistic example may help in this direction. We might suppose, for the sake of argument, that the properties of sugar and saccharin were so exactly alike that the two substances were absolutely indistinguishable in taste, the only difference being that very much less of saccharin was required than of sugar to sweeten the same quantity of food. Let one ounce of saccharin be equivalent to 250 ounces of sugar, which is not far from the true proportion; and, to make the conditions fair, let us assume that saccharin and sugar are each used exclusively by the same number of persons. There would thus be required for consumption 250 times more sugar by weight than saccharin. If it be also assumed that the technical difficulties of production are the same for both articles, so that the cost of production is the same

if both are manufactured on the same scale; then we shall not be far wrong in taking it for granted that the cost of production of sugar will be reduced to about one-sixth of the cost of production of saccharin per pound, when 250 times as much sugar is made as saccharin. Thus under these conditions, and in the absence of any disturbing factors, the price of sugar would be about one-sixth that of saccharin for the same weight. This difference of price would have been brought about solely by the fact that a larger quantity of sugar was required than of saccharin to give the same amount of pleasure; and it may therefore be taken as illustrating the principle of the effect which the law of unequal quantities has upon prices\*. In actual commerce it is probable that there are no two substances which can be substituted so perfectly for one another, as we have assumed to be possible for sugar or saccharin. In fact, man usually derives from various articles such different proportions of his total pleasure, that much greater differences in the quantities in

\* As a side issue from this illustration it may be noticed that a condition in which saccharin was but six times as dear as sugar, and yet 250 times as sweet, besides tasting the same, would be unstable. Saccharin would be so much cheaper in use, that in more or less time it would wholly replace sugar. As a matter of fact the cost of production of saccharin is probably much greater than that of sugar, even when both are produced on the same scale, but the chief reason why it does not actually replace sugar in ordinary use is that its taste is not so pleasant.

demand result from this cause, than could possibly be produced by the action of the principle of unequal quantities. The cost of production of unit weight also varies enormously for different articles, even when manufacture is carried on on the same scale. These influences are of such importance, that they must be estimated, and allowed for, before the action of the principle of unequal quantities is apparent.

### *Causes of Anticipal Pleasure*

Pleasure felt owing to the anticipation of a future pleasurable event is a common experience of everyday life. The intensity of such *anticipal* pleasure, as it will here be called, is dependent upon three factors:—

- (1) The amount of the expected pleasure, *i.e.*, its intensity multiplied by its duration;
- (2) The propinquity or remoteness of the future event, *i.e.*, its distance in time,
- (3) The certainty or uncertainty of the future pleasure being experienced, *i.e.*, the probability of its occurrence.

A simple example will render the matter clear. Travel, or stay in the country during a holiday—which is to be regarded as a case of use of different surroundings for the eyes to look at, with perhaps an improvement in the air consumed—is often looked

forward to for a long time beforehand. The intensity of the anticipal pleasure will be greater the longer the holiday; greater also, the more intensely one expects to enjoy it when the time comes. In other words the *amount* of pleasure expected is one factor determining the intensity of anticipal pleasure. Again, the nearer the date fixed for leaving home approaches, the greater does the intensity of anticipal pleasure become: at first, when the holiday is still many weeks ahead, the intensity increases slowly; then, as the time grows closer, it increases faster and faster, until it culminates on the eve of departure. Finally, the intensity of anticipal pleasure at any time before an event depends upon the probability of its occurrence, as judged at that time. If the enjoyment of the holiday is felt to be almost a certainty, it is looked forward to with pleasure much more intense than if there be some doubt as to whether it can take place. Exactly as the probability of the holiday taking place increases, so does the intensity of anticipal pleasure grow in the same proportion.

A holiday is but one among a myriad examples that might be chosen. Man is constantly looking forward to the future, scheming for pleasures he feign would have, and feeling no small degree of happiness at the thought of them. But precisely as they appear more or less certain, so does the glow they cast before them wax or wane. Castles in the

air totter to earth as soon as the reason weighs their chance of happening, and every achievement for which we long elates or depresses us alternately, as changing moods estimate the probabilities of success. What, then, is more natural than that man should endeavour to ensure the certainty of events he desires? His effort to do so is, indeed, the secret spring of modern civilisation. All our vast industrial undertakings and commercial enterprises are the visible signs of man's endeavour to provide for his future enjoyment. By accumulating stocks of articles which usually give him pleasure a man may make his future enjoyment of their use or consumption reasonably certain, excepting for the contingencies of their loss by fire, or his death, and the chance of the former is provided for by insurance, which will usually allow of the lost articles being replaced. He therefore makes goods with ever increasing ease and rapidity, and collects them about him, either as his personal property, as trade stock, or in the form of money—an article immediately convertible by exchange into any other. The science of economics is very largely occupied in studying man's efforts to obtain anticipal pleasure by the provision of stocks of goods for future use: almost all the complicated practices of production and exchange resolve themselves ultimately into manifestations of these efforts.



*Difference between Savage and  
Civilised Man*

Modern life concentrates its attention with ever increasing earnestness upon care for the future. Almost from child-hood every person of any education at all has ambitions concerning his means of livelihood in later years, and constantly calculates his prospects of success. Thoughts are thrown forward nearly from one end of life to the other; and 'cares of the moment are but ripples on the tide of achievement and hope.'\* In strong contrast to this dominance of forethought stands that apathy concerning the morrow, into which a few of our unfortunates slip, but which is essentially characteristic of the savage.

Inhabitants of central Australia, perhaps the lowest type of mankind, live absolutely from hand to mouth, stalking beasts or gathering wild fruit just as hunger prompts them. If their sensibility is too dull for them to suffer much when in want of food, neither is it keen enough for them to know the joy of anticipation. The islanders of the Pacific, somewhat more advanced, are used to laying by small stocks of dried fish, cocoanuts, and other easily obtainable foods. They do not trust for shelter to natural caves or bowers, but are capable of building

\* W. S. Jevons, *Theory of Political Economy*, 3rd edition, page 35.

themselves rude huts. Next in civilisation's scale come men such as the Papuans, Red Indians, Negroes, and Malaysians, who find a year or two ahead not altogether beyond their range of mental vision. These have the patience to cultivate crops, in spite of the many months which must elapse between the sowing and the reaping.

The growth of the power of experiencing anticipal pleasure is outwardly evidenced by an increasing desire for property, that is, for some security of future pleasure. The possessions of savages are very few. The Chinese and East Indians on the other hand accumulate a few great fortunes, often in the utmost variety of goods; and, if the majority of their people are poor, it is due more to lack of opportunity for acquisition than of desire. Amongst Europeans desire for property has become more overmastering, in company with increased sensibility to anticipal pleasure; the latter being perhaps a concomitant of growing alertness and mental activity. A capacity for invention, stimulated in the first place perhaps by wants due to the rigors of a broken country and a northern climate, has led, not only to a satisfaction of most of man's existing desires, but to a positive rage for the creation of new tastes, that the inventive faculty may have scope for its action. Men in search of a livelihood deliberately seek to discover new tastes or to stimulate old ones, by inventing some hitherto

unthought of machine for the purpose. Amongst numerous examples that readily occur to one, are the sensations of cycling and motoring, the former novel some thirty years ago, the latter hardly yet past that stage. The desire of Londoners for tropical fruits has been greatly stimulated by the improvement of refrigerating plants, and by the increased rapidity and cheapness of ocean transit; and a taste for iced drinks is pre-eminently one which readily responds to any efforts made to provide them cheaply. The ingenuity of music-hall managers, and entertainment-mongers in general, would provide a host of instances. Have we not learnt to 'switch-back' and 'shoot the chute,' and to feast our eyes on acrobatic contortions, 'looping the loop,' and other absurdities?

It is perhaps more the constant striving of the Westerner to find new ways of experiencing pleasure, to cultivate new tastes, elevating or degrading, that distinguishes him from the Chinese or the Indian, than power of anticipation of events more distant in time, such as distinguishes the Indian and the European alike from the savage. Asiatic civilisation appears to have rendered its protégées, like Europeans, capable of forethought years ahead, even to the end of a lifetime. Their difference may lie, not so much in the distance ahead to which the thoughts are thrown, as in the frequency, vivacity and imaginativeness of such thoughts. Whatever

be the exact cause of the difference, there can hardly be question that the pleasure derived by the average man of European extraction from the anticipation of future pleasures is more intense, and probably also more frequently enjoyed, than that of the average Asiatic. The same is true as regards the difference between the Asiatic and the savage, with the added disadvantage to the latter, that a very few years, months, or even days ahead, constitutes his utmost range of forward vision.

### *The Causes of Pain*

The various means by which pleasure is produced have been discussed in detail; there remain to be considered the causes of the opposite feeling—pain. It has already been stated\* that pain, like pleasure, is caused in three ways:—

- (1) By the memory of past events;
- (2) By the sensation of present events;
- (3) By the anticipation of future events.

Leaving out of account, as unalterable, pain caused by memories of the past, attention may now be devoted to studying the causes of present pain. When the latter have been described, a few words will suffice to explain which of them are most frequently anticipated, and which, therefore, are of economic importance as causes of anticipal pain.

\* See page 32.

*The Causes of Present Pain*

Pain is the result of bodily or mental injury or discomfort. Bodily pain is usually a consequence of destruction of tissue or hindrance of the natural organic processes, whether produced by accident, disease, or the ultimately beneficial use of surgical instruments. Pain arising from accident or disease, so far as it is unforeseen and unavoidable, lies without the scope of economic science. Pain, on the other hand, which is purposely suffered, in the hope that the action which causes it will produce pleasure more than sufficient to counterbalance it, falls within the pale of the science.

*Time Relation between Pleasure and Pain*

In the economic study of pain its relation with pleasure is always of importance; and three different cases may be discovered according to the relations in time between the pleasure and the pain.—

- (1) The pain follows the pleasure; as in the after effects of many forms of indulgence—drinking intoxicants, opium-smoking, and the like.
- (2) The pleasure follows the pain; as in the common case of man's work for his daily bread—for labor is often a painful effort. Submission to the hands

of a dentist is a case of suffering pain in order to avoid greater pain in the future, and it may be classed here, because avoidance of anticipated pain produces pleasure, due to satisfaction that the pain has been avoided.

- (3) The pleasure and pain may occur simultaneously; as when one endures the hot stuffiness and uncomfortable seats of a theatre for the pleasure of the play, or a lame man walks with difficulty for the sake of change of scene.

Cases of the last relation, when the pleasure and pain are felt together, must affect all persons in the same way: if the intensity of pain caused by the action exceeds the intensity of pleasure, the action will be stopped; if the reverse be the case it will be continued. When, however, the pleasure and pain are not felt simultaneously, the person's capacity for anticipation has a marked influence on ~~the~~ continuance of the action.

Men of uncivilized races, for instance, and also unfortunately many persons of our own race, can look so little ahead, that they indulge themselves freely at the moment without thought of the pain which must follow, be it bodily suffering, or the mental pain of disgrace. At the same time such men are equally incapable of suffering pain in honest

labor with a view to future pleasure. It is the needs of the moment only which impress them. On the other hand, another class, types of the highest civilization, are so weightily impressed with the possibilities of the future that they almost enjoy stinting themselves in the present, and cheerfully endure pain in severe exertion for the sake of a harvest of pleasure which can only be reaped after the lapse of many years.

Persons of the former kind, who exhibit an incapacity for foreseeing pain, ought not to be blamed so much as pitied. Deficiency in inherited qualities, as well as lack of early education, not only in moral strength, but also in imagination and in just ambition, has stamped them with a type of mind which can realise only the present. Hard work for a distant reward, which comes easily and naturally to men who can anticipate, is for those immersed in the present a herculean task. Likewise, resistance to the temptation to gratify cravings of the moment without regard to results, is correspondingly harder for the latter than the former.

### *Actions which Produce Pain*

From the strictly economic point of view the most important aspect of pain is the nature of the actions which produce it. Pain (including discomfort,

according to definition) may be caused to a person in any one of the following ways.—

- (1) By failure to satisfy vital wants, or to avoid bodily injury;
- (2) As an unavoidable accompaniment of consumption or use;
- (3) By the near presence of something objectionable or inconvenient;
- (4) As a result of labor

These different causes will be considered and illustrated in the order in which they have been mentioned

### *Failure to Satisfy Vital Wants*

The failure to satisfy vital wants, especially of food, clothing and shelter, is an ever imminent source of pain; and yet it is one against which the civilized peoples of the earth have provided such effective safeguards, that but few of their number suffer from this cause. Most of the pain which we suffer either arises from causes less easily prevented than failure to satisfy bodily wants, or is purposely incurred. It is interesting to note, however, that a very large proportion of man's total property is consumed or used with the object of avoiding pain from vital wants—perhaps a third or a half, or even more in some countries. Our houses, most of our food and clothing, as well as culinary apparatus, and



factories for making clothes, all fall within this category. The manner in which such commodities give pleasure by the knowledge that they prevent pain has already been explained, in the section in which the pleasurable feelings of small intensity derived from the use of articles of clothing were considered (page 52).

In close relationship to pain suffered from failure to satisfy vital wants stands that incurred through neglect to avoid probable injury of body or mind. The person who sees a forest fire approaching, or a river rising to flood level, will experience pain if he do not save himself; and any vehicle or boat by which he may move to a place of safety, or the service of any person who assists him, is for him a means of avoiding pain, and can be legitimately treated of in economics. The service of a dentist is of the same nature. If a man neglect the probability of further decay in a tooth already touched, he is nearly sure to suffer pain, just as if he had neglected to provide himself with the means of procuring warm clothing for the winter. Failure to avoid influences which may contaminate the mind often results in pain, in the same way as neglect of bodily harm. Injury of mind arises from association with men of corrupt deeds or speech, or merely from foul or brutalising sights. Sometimes the injury is unconscious, but when perceived it often causes acute mental pain.

*Pain Accompanying Consumption and Use*

Instances of pain felt as an unavoidable accompaniment of consumption or use have already been mentioned. In some cases the pain follows the period of consumption after a more or less prolonged interval, as in the case of the after-effects of strong drink, or stiffness resulting from a hard day's exercise; but very frequently the pleasure and the pain are felt together.

The latter case may well be exemplified by imagining that a little boy eating chocolate soon begins to feel a twinge of tooth-ache as the result. As he continues eating he gives fresh stimulus to the pain, which gradually grows in intensity. After a while the pain may become so intense that the pleasure gained is more than counterbalanced by the pain; and, if he be a type of average human nature, he will at that moment cease further consumption of chocolate.

*Diagrammatic Illustration of Pain attending Consumption*

The example just described lends itself well to illustration by means of curves. In fig. 13 let intensity of pleasure be measured, as before, vertically upwards from OX, and intensity of pain vertically downwards from OX, whilst time is



of the chocolate has been eaten: then, beginning at a moment represented by C, it increases in intensity; at first gradually and afterwards more rapidly, as shown by the curve CMD. Whilst the boy feels both pleasure and pain the two kinds of feeling neutralise one another; and whether pleasure or pain results from the consumption of the chocolate depends on which of them is in excess. A resultant curve may be drawn to show the intensity of the balance of feeling at any moment, whether painful or pleasurable; and this may be continued during the whole period of consumption, even supposing the period to extend to the normal length of time, which in this case means its duration after the pain has exceeded in intensity the pleasure. This curve is shown by the broken line EPK in the figure, it is obtained by simply plotting successive points for every moment of time, for which the balance of feeling has been ascertained by subtracting the intensity of pain from the intensity of pleasure, or vice-versa. For instance, at the time represented by the point G on OX the intensity of pain is GF, and the intensity of pleasure GL. If from GL a length LH be cut off equal to GF, the remaining length HG represents the balance of pleasure over pain at that moment. The length HG is simply a measure of the height of the point H above OX; and if points similar to H were found for every moment of time, they would form the curve EHP.

*Cessation of Use or Consumption Involving Pain*

The point P represents a moment of special interest, because then the intensity of pain has become equal to the intensity of pleasure, as shown in the figure by the line PM being equal to the line PN. The resultant curve therefore passes through the line OX at P; and this means that at that moment P the balance of pleasurable feeling ceases to exist. After this instant the boy has no longer any incentive to continue his consumption of chocolate, and he will stop, therefore, precisely at that moment. For the sake of completing the diagram, however, let us assume the boy to be under compulsion to eat a certain quantity of chocolate, so that he has to continue the consumption of it in spite of the fact that it gives him less pleasure than pain. The pleasure curve may now be continued to B, as in the normal case when no pain is felt, whilst the pain curve may be supposed to fall more and more rapidly to D. The resultant curve, now obtained by subtracting at each moment the intensity of pleasure from the intensity of pain, follows the course PK, merging itself in the pain curve after the time B, when the chocolate ceases to give any pleasure at all.

Many other examples might be quoted: a man playing golf under a hot sun, a novice smoking his first cigar, and so forth; but the principle of every

case is the same. The time when any particular kind of use or consumption will be stopped is always determined in the same way: by the intensity of pain it produces becoming equal to the intensity of pleasure.

The cessation of use or consumption of those substances which engender pain after, but not whilst they are producing pleasure, depends in the same way upon the balance of pleasure and pain, but in this case the pain is anticipal. Its intensity will vary, not only with the amount of the anticipated pain, but also with the subject's power of anticipation. Hence it is that some men will continue hurtful forms of consumption so much longer than others.

### *Presence of Objectionable Objects Produces Pain*

The third way in which pain is produced was stated to be 'by the near presence of something objectionable or inconvenient'. Instances of intense pain being caused in this way are not very common in everyday life. It is true that the near presence of a very large fire would cause severe pain, but then we are usually successful in avoiding the immediate neighbourhood of large fires. As regards pains of great intensity, therefore, this cause has little practical interest.

Quite the reverse is true, however, in respect of pain of lesser intensity—mere discomfort. The presence of disagreeable sights, sounds, or odors, of obstacles to our freedom of movement, of dirt, or of any kind of matter where it is not wanted, may occasion worry and annoyance. Tanneries and manure heaps, if in one's neighbourhood, are causes of economic pain; and so, for many people, are street music, and hideous advertisements, of which unfortunately we have too many examples around us. Again, wet paint, a cart standing across the road, a factory chimney belching forth smoke, or a busy electric tram line, are all sources of pain to those who must pass or reside by them.

Some things may give pain to one man by their presence, but pleasure to others. A railway engineer, for instance, is troubled if he find that his line must cross a navigable river, or if he be prohibited from tunnelling under a building of historic interest. The river and the building give pain to him, but pleasure to others. A foot-path across a man's land has a similar effect; so also has a new railway, bringing swarms of tourists into the lonely haunts of a lover of nature. Other things have the reverse effect—they please but one and pain many; and they are the more common. A notorious example is a musical instrument in the hands of a learner; whilst a scorching motorist, a traction engine, tobacco smoke amongst ladies, or

a screeching parrot, supply other illustrations.

In view of its economic consequences, one of the most important ways in which things give economic pain is simply by their bulk causing them to occupy space whose use is desired for other purposes. A man's property is apt to accumulate until the housing of further additions becomes a matter of considerable inconvenience; and then it may be said that every article in the house is causing pain in proportion to the space which it occupies. A merchant, if he deal in a bulky commodity, such as wool, wheat or coal, is pained by the space which his store of it occupies; and he has very substantial evidence to offer of the pain he suffers, in the shape of the warehouse rent he must pay for space to house the stock.

### *Labor a Cause of Pain*

The last of the principal ways in which pain is caused is by labor. A man in good health may take pleasure in his work, especially if it be of a congenial kind; but everyone must admit, if he has analysed his feelings, that sooner or later he becomes tired of work, and a continuance of it becomes an effort which causes, economically speaking, mental or bodily pain. The subject of the pain caused by labor is so important, and is so intimately connected with other matters to be discussed in conjunction



with labor, that it will be better to postpone any further consideration of it to a later essay specially devoted to the treatment of labor.

### *The Causes of Anticipal Pain*

Pain is frequently produced by the anticipation of suffering at some future time; and the intensity of the anticipal pain depends upon the same three factors which, as we have seen, determine the intensity of anticipal pleasure. The intensity of the anticipal pain will increase.—

- (1) As the amount of the future pain expected increases,
- (2) As the time is approached when the pain is expected, and
- (3) As the occurrence of the expected pain becomes more probable

Much of the anticipal pain of life is beyond the scope of economic investigation; fears of the loss of relatives or friends, and anxiety over possibilities of accident or illness need not be touched upon here. On the other hand, that kind of anticipal pain, which may be wholly or partially destroyed by the possession of things which will help to prevent or neutralise the expected pain, is a proper subject for the studies of the economist. Worry, for example, over business prospects, lest the wherewithal for the family support be not forthcoming, is food

for economic thought; because such pain can be dissipated by a large accession of wealth, whether the latter be obtained by harder work, or new methods, or in any other way. As another example of anticipal pain of which the economist must treat, we may take the pain felt by anyone who is expecting a large accession of property, and has no suitable place in which to put it. A farmer who sees that in all probability he will harvest a phenomenally heavy crop of wheat, and wishes to hold it owing to the lowness of the prevailing price, will be worried—economically pained—if he be in want of a large enough barn in which to store it, and his worry will continue until he is able to provide sufficient space.

Very many other instances of anticipal pain which falls within the purview of economics might be quoted. A shop-keeper sees that a rival is about to start in business upon the opposite side of the street, and the owner of a large house finds a scheme on foot to build a factory or workmen's cottages on a contiguous plot of land. Both feel anticipal pain; and they will take steps, one by lowering prices, the other by trying to buy the land, to avert the cause of it. An instance of combined action to prevent expected suffering and thus to lessen anticipal pain, is to be found in the practice of the Meteorological Office, which, through the Post Office, exhibits weather forecasts in agricultural districts, and issues storm warnings to seamen.

*Unequal Anticipation of Pleasure and Pain*

The consideration of anticipal pleasure led us to observe that people differ very much in their capacity for anticipation both of pleasure and pain: some persons, for instance, are almost incapable of foresight as regards future feelings, whilst others find it the easiest and most natural trend of their thoughts. It may be of interest now to extend our observations, and note that the capacity for the anticipation of pleasure and of pain is often unequal. Individuals of a pessimistic or morbid disposition probably anticipate pain more easily than pleasure; those of optimistic temperament, on the other hand, anticipate pleasure more easily than pain.

The economic consequences of differences of temperament would probably repay more extended investigation than has yet been given to them. The pessimistic man is perhaps over-cautious and unenterprising; also, when bargaining is possible, he probably pays low prices for things, because he does not make a high estimate of the pleasure to be derived from them. The optimistic man, on the other hand, is generally over sanguine and rash; he plunges into an enterprise, glowing with anticipal pleasure at the successes he expects, and seems to be incapable of anticipating any painful results. He is also prone to pay for things what to others of his means would be very high prices, because he

forms extravagant estimates of the pleasure which they can afford him

Whilst there can be little doubt that the optimist leads, in general, a happier life than the pessimist, he is probably a greater bane to the community at large. The optimistic temperament, combined with ability, leads a man to plan great schemes, which require the co-operation of a number of persons, and these people, without the slightest intention of misleading, he deludes into fanciful expectations of success. The result is that much capital is wasted, and pain is caused to many innocent persons

Men with well balanced temperaments are the mainstay of a nation's progress. If there are too many optimists in a country a good deal of capital is wasted; a feeling of suspicion and insecurity takes possession of the public, which lessens the stimulus to saving, and causes them to send abroad for investment whatever money they have. On the other hand, the presence of too much pessimism is likely to mean stagnation, for incentives to hard work and saving are wanting if there be many who make a low estimate of future pleasure compared with that of the present.

*Connection Between Psychology and  
Economics*

Such considerations as those stated in the last section suggest a very close connection between the sciences of economics and psychology, a connection of which ample evidence may be found, even in the study of the intricate industrial and commercial life of the present day. Fostered perhaps by the recent growth of a closer and perfectly correct application of mathematics to economic theory, there exists at present an unhealthy tendency to regard problems of exchange and production as purely mechanical. A fictitious man is set up as a unit; the innate differences between men, which result in different actions, are largely disregarded; and a theory is evolved which is an explanation of only a few amongst a thousand facts. The remainder go unheeded by the theorist, as any close observer of modern life could show. Economics would become a more living science, far more useful in its practical applications, if it became more psychologic in its method, if there were more introspection, and if its theories were founded on a more rigorous and detailed analysis of ultimate motives.

### III

## UTILITY

### PART I--DEFINITIONS

#### *Definition of Utility*

THE purpose of this essay is to investigate the circumstances under which material things have the power of causing pleasure or warding off pain: and, further, to determine the relation which exists between the intensity of positive feeling produced when a thing is acting upon a person's senses and the circumstances which surround the person and the thing.\*

In order to avoid prolixity of diction, a single word—*utility*—is used to denote the power belonging to a thing of being able to produce pleasure or ward off pain: and anything having such power is said to

\* All things which in any way affect the senses, directly or indirectly, are here called material

possess utility. More precisely, *utility* may be defined as the property possessed by a thing in respect of a certain person of affording him pleasure, or warding off his pain, either during his actual use or consumption of the thing, or during the period of his anticipation of use or consumption thereof. For example, bread which a man is eating has utility for him; and so has bread which lies in his bin, and which he contemplates eating at some future meal. On the other hand, all existing bread which is not in his possession, legally or actually, has no utility for him; for he cannot derive pleasure from it either by eating it or by anticipating his consumption of it. A man who anticipates with pleasure the eating of bread which lies in a baker's shop because he has money to buy it with is deriving pleasure, not from the bread, but from the money. The money has so much the more utility because it is exchangeable for bread; but the bread itself has no utility until it comes into his possession. This fact becomes clearer if we imagine that the man is exchanging meat for bread, instead of money. The meat only possesses utility for him on account of the pleasure which eating it could afford him; and it is obvious that, as he must give away the meat to get the bread, he has lost the utility of the meat when he has gained that of the bread. Similarly the bread had no power of giving him pleasure until he had gained possession of it by parting with the

meat. for he could not derive pleasure from anticipating the consumption of both of them.

### *Possession Essential to Utility*

Economists have not been accustomed to make the possession of an object by a person a condition of its having utility for him. It is usually said that utility is that quality in things in virtue of which they afford satisfaction and enjoyment to those who possess them, or create a desire in persons to get possession of them: or even that anything which an individual is found to desire and labor for must be assumed to possess utility for him† If, however, the conception of utility is to be susceptible to rigorous quantitative treatment, as it seems essential to the progress of economic science that it should be it must be narrowed down to be identical with that definite power of giving positive feeling which belongs solely to things in a person's possession. For that quality which leads men to regard things as desirable possessions—a quality which would give them utility if they were possessed—it will be advisable to find a new and distinctive name in order to avoid possibility of confusion of thought.

\* Bithell, *Merchant's Dictionary*, new ed., p 312

† W S Jevons, *Theory of Political Economy*, 3rd ed., p 38



The sense in which the term *possession* is here used is a slight extension of its ordinary meaning. Actual ownership is necessary of all consumable things before they can be consumed—excepting of such things as air, sounds, light, and, frequently, water—but the same is by no means true as regards the use of usable articles. A great number of things, such as buildings, water-mains, trams, and so forth, stand in communal ownership, either through the state or a municipal body; and are therefore used, either simultaneously or successively, by many different people. Any well-conducted person has the right to use these things. Any person also has the right to make use of many things by merely looking at them, such as natural scenery, flower gardens, and architectural triumphs or failures galore. Every person who has a commonly-accepted right to use things may be said, for the purposes of this discussion, to *possess* them whenever he does use them, or anticipates using them.

### *Actual and Prospective Utility*

Pleasure may be caused either during the actual use or consumption of a thing, or by anticipation thereof; and two kinds of utility corresponding with these two causes of pleasure may therefore be recognised. The first—that possessed by a thing only at the moment when it is in the act of giving



pleasure by use or consumption—is usually known as *actual utility*, the second—that pertaining to a thing which gives pleasure by anticipation—is called *prospective utility*. For example, as soon as a boy becomes owner of an apple, or other good thing, it possesses prospective utility for him. When he begins to eat it, however, the apple is immediately endowed with actual utility, because at the moment it is giving the boy pleasure.

### *Definition of Disutility*

In the preceding essay on Pleasure and Pain a description was given of the four ways in which present pain may be caused. In two of these ways the pain is produced by the action of material things on the senses, namely, when pain is caused either: (1) as an unavoidable accompaniment of consumption or use; or (2) by the near presence of something objectionable or inconvenient. Everything which has the power of producing pain in either of these ways is possessed of a property which may be regarded as the direct opposite of utility; and which, to signify this relation, is called *disutility*. In terms of precision, *disutility* may be defined as the property possessed by a thing in respect of a certain person of causing him pain, or lessening his pleasure, either during his actual use or consumption of the thing, or during such time as it is present where it can

affect his senses, or during the period of his anticipation of use or consumption, or of the presence, of the thing.

Examples of things which possess disutility are readily found. A house-keeper, for instance, finds the ashes of fires in the way and useless; she has also no use for odds and ends of meat and vegetables, which, if kept on the premises, would soon become offensive. These things, then, possess disutility for her. She may also have so many old bottles about the house that she is glad to give them away to anyone who will take them. The bottles have disutility for her, but it is interesting to observe that for the man to whom they are given they must possess utility, or he would not accept them. A number of things might be mentioned, such as sewage, soot, the odor of a tannery, hideous noises, and so forth, which possess disutility for almost everybody. A great number of other things, however, possess disutility only for certain people, or only because they are in the wrong place. The smell of tar is offensive only to some persons, and for them alone has it disutility. Water spilt on the floor has disutility, though other water which lies in a basin, pipe, or reservoir, invariably possesses utility.

The examples so far quoted are things which cause pain by their mere presence in a person's neighborhood. It is hardly necessary here to give

examples of things which possess disutility in virtue of giving pain during use or consumption, for a number of instances of things which give pain in that way are mentioned towards the end of the preceding essay on Pleasure and Pain.

It is important to notice that there are many things which possess both utility and disutility at the same time. A pudding which is too hot to be eaten without pain is a case in point, and so is a photographic developing solution, which is capable of the disservice of staining hands and clothes as well as of the service of rendering the picture visible. Perhaps the commonest way in which things possess disutility is merely in virtue of their size. When they occupy valuable space they cause pain and thus possess disutility, which detracts from their utility. The disutility of things may sometimes be so great as to quite overbalance their utility—as in the case, say, of bound volumes of old and bulky periodicals. If the excess of disutility were sufficient to warrant the labor of their removal, the volumes would be taken out and burnt, unless they could be sold. If they could have contained the same amount of information in the less space, they would have been kept.

Utility and disutility correspond so far with one another that *possession* is to be regarded as a necessary condition of the latter, just as it is of the former. In the case of disutility, however, the

ordinary meaning of the word *possession* must be stretched to such an extent that its use is hardly legitimate, for people try to dispossess themselves of things in which disutility is paramount. It is therefore better, perhaps, to say that the conditions of a thing possessing disutility for a person are either that it is in relation with his senses or that he anticipates that it will be in such relation. Thus a sewage-farm has no disutility to a man who is not in its neighborhood and never expects to be so; but directly he learns that he will probably have to go near it, it acquires disutility for him.

### *Actual and Prospective Disutility.*

Corresponding with actual and prospective utility there exist *actual* and *prospective disutility*. The disutility is actual whilst pain is actually being caused, either by use or consumption of the thing, or merely by its being present in any place where one would rather it were not. The disutility is *prospective* whenever the person anticipates that the thing will cause him pain in either of these ways. Returning to a previous illustration, the hot pudding evidently has prospective disutility for anyone who fears that it is too hot for him to eat, and it would possess actual disutility for him if he were to try it and be burnt. Likewise a house which a man learns is to be built close by his own house has prospective

disutility for him, even before it exists as a house, and actual disutility when it is built and interferes with his view and light.

### *Definitions of Potulity and Dispotulity.*

It has been mentioned already that things may possess every material attribute necessary to give them utility for some person and that they may yet have no utility, simply because, either from physical difficulty, or legal restraint, they are not in his possession. Such things possess indeed a kind of potential utility, which is immediately changed into utility itself by the mere fact of the things passing into the person's possession. The term *potential utility* is not, however, a good name for this property, partly because some persons might be led into supposing it to be a kind of utility—which it is not—and partly because the term has been previously used in a somewhat narrower sense than this. It seems desirable, therefore, to coin a new name for this property, and, with the object of making it descriptive, I have chosen *potulity*, which will be a reminder that though not itself utility it is in a sense a kind of potential utility. *Potulity* may be precisely defined as that property possessed by a thing for a certain person, by virtue of which

it is supposed that it would have utility for him if it came into his possession under suitable conditions of time and place

Just as disutility is the antithesis of utility, so there exists *dispotulity* as the opposite of potulity. Properly defined, *dispotulity* is that property possessed by a thing for a certain person, by virtue of which it is supposed that it would have disutility for him if it came into relation with his senses, or its doing so were anticipated.

### *Definition of Commodity*

A very convenient term—*commodity*—is in general use amongst economists to denote for a person any kind of article, substance, or force, indeed any kind of thing whatever, which possesses either utility or potulity for that person. For instance, a piece of chocolate in a boy's pocket has utility for him; but a cake of chocolate in a shop window has no utility for him, but only potulity, for he cannot anticipate eating what he does not possess. The chocolate in the window is a commodity for him, however, equally with that which is in his pocket; for he believes that, if he did possess it, he would derive pleasure from it.

There is no restriction whatever as to the nature of a thing that it may be called a commodity; it is only necessary that it should fulfil the requisite



conditions. The sound of music may be a commodity, or a speech by an actor, just as much as a chair, a table, a picture painted by a great artist, or the light of a street lamp. Less tangible things, such as services, personal or otherwise, knowledge, motion, heat, cold, and a host of others, are also capable of being commodities. The work done by a cook or housemaid is a commodity to her mistress, so is the labor of a factory hand to his master, and the service of a soldier to his country. The mere movement of an article from a place where it is of little use to one where it is wanted, is often a commodity; and so is any item of useful knowledge. Railway companies and newspaper proprietors, who provide respectively movement and information, live by furnishing commodities to the public, just as much as farmers or cotton spinners. Hotel managers, or landlords of flats, who warm their rooms by hot water or otherwise, supply heat; and owners of deep mines, who cool the air for their men by the liberation of compressed air, supply cold. The heat and cold, however produced, are the objects desired, and are therefore commodities to those who desire them. The word commodity has an exceedingly wide application, and may, if the circumstances warrant it, be applied to ~~almost anything that can be thought~~ of.

*Definition of Discommodity*

A very large number of things, as has been already mentioned, possess both utility and disutility. If its utility be in excess of its disutility, and likewise its potulity in excess of its dispotulity, a thing is a commodity. On the other hand, if its disutility and dispotulity exceed its utility and potulity, a thing is termed a *discommodity* for the person in question. Street music, for instance, is a discommodity to many persons of refined musical taste, though to others a commodity; and poisonous plants, vermin, weeds, sewage, sawdust, garbage, and other waste products, are discommodities to nearly everybody.

The same substance, or action, may affect different people in manners more strikingly different than has been indicated yet: to some a thing may be a discommodity, but to the majority a commodity; or to many it may be a discommodity, but to a few a commodity. Examples of the former are to be found in certain foods, such as eggs, sugar, raw blackberries and raspberries, which almost all men eat with pleasure, but which are a source of bodily trouble to a few peculiarly-constituted persons. Again, the chiming of church bells, a soothing and pleasant sound to most, is to some a medium of peculiar irritation. Things which are discommodities to the great proportion of mankind, but

commodities to one or another, here and there, are very easily mentioned. Such for instance are rags, bones, and old bottles, for they are collected and supply a living to a small element of the community. Garbage, too, is a commodity to the councils and companies which obtain heat to drive electric plants by its destruction. A traction engine is a commodity to its users, but a discommodity to the general public.

*Enlarged Application of the Term  
Commodity*

In the strict use of the term a thing can be called a commodity only with reference to some stated person, because it may not be a commodity to others; but, in the absence of another word, it has become customary occasionally to enlarge the scope of its application, and to speak of articles or substances as commodities either with reference to mankind as a whole, or to a nation, or to a particular class of people. This is legitimate, because many things, such as bread, meat, chairs, or boots, are commodities to a large majority of persons; and, as staple articles of commerce, they require to be frequently spoken of in general terms by the economist. The context will always make this special use of the word clear.

A brief reference has already been made to the scientific interest which would attach to a classifica-

tion of objects, forces, etc. (indeed, of all things which may be commodities to anybody), with regard to the manner in which they act upon the senses. Whilst any such inquiry is quite beyond the scope of this little volume, it is nevertheless essential to call attention to one property of commodities which would fall under that heading.

### *Divisible and Indivisible Commodities*

An important distinction is recognised between commodities which are divisible to any extent, without their power of giving pleasure being thereby in any way impaired, and such, on the other hand, as cannot be divided into portions of any desired size without occasioning their destruction, or at least the loss of their power of producing pleasure in the same manner as before. Commodities of the former kind are said to be divisible: those of the latter kind indivisible. Examples of divisible commodities are butter, meat, sugar, in fact most foods except perhaps eggs; milk, oil and other liquids; all metals when in lumps or bars, i.e., not manufactured; and countless other commodities, which may be either consumable like foods, or usable like the metals. The indivisible commodities, such as articles of furniture, clothing, ornaments, machinery, etc., form the great bulk of the things with which man surrounds himself, and are almost

without exception usable rather than consumable. Some doubt may exist whether such foods as fruit or eggs are to be regarded as divisible or the reverse. Fruit may perhaps be classed as divisible, because an apple, for instance, is not impaired in pleasure-giving properties by being divided into several parts of any size, so long as the whole is eaten immediately afterwards. Yet it is not strictly divisible, because it cannot be put together again and resume its former properties, as, for instance, can metals or liquids. Eggs, for this reason, must be called indivisible, except when cooked, a process which really transforms them into a different commodity.

### *Degree of Utility*

The power possessed by a commodity of being able to give pleasure or ward off pain—in other words, its utility—varies in intensity or strength in accordance with the intensity of the pleasure which it creates, or the supposed intensity of the pain which it wards off. This intensity, or strength, of utility is generally known as *degree of utility*; and the same term is used whether the utility be actual or prospective. For instance, a piece of chocolate will give a small boy a higher intensity of anticipal pleasure than a piece of bread and butter of the same size. The chocolate may be said then to have

a greater degree of utility for him than the bread and butter. In like manner a poor man's only pair of boots has a higher degree of utility for him than a single pair of gloves, because the pain of going without boots in cold weather would be greater than that of going without gloves.

### *Actual Utility of Consumable Commodities*

The variation of intensity of pleasure during the consumption of a commodity has been studied in the preceding essay, and it is hardly necessary to point out that the degree of actual utility of each successive portion consumed decreases in exact proportion to the intensity of pleasure which it produces. Returning to the example of a boy eating cherries already described (page 48), and substituting throughout 'degree of actual utility' for 'intensity of pleasure,' we see that the curve ACD (fig. 7) shows, by its height above the base-line OX at each step, the degree of actual utility of the corresponding cherry as it came to be consumed. It is worth noting that the degree of actual utility of any particular cherry cannot be determined before it is consumed, because, assuming all to be alike, the intensity of pleasure produced by each depends solely upon whether its turn to be eaten comes early or late. For this reason the actual utility of consumable commodities is of little interest or importance.

*Actual Utility of Usable Commodities*

The degree of actual utility of a usable commodity is a constantly varying quantity. The intensity of pleasure afforded by a bicycle, for instance, depends not only upon who is the user of it, but also upon his state of mind at the time he is using it. Towards the end of a period of use it will have a lesser degree of actual utility than at the beginning; and its average degree of actual utility in each period of use will probably be different, because the average intensity of pleasure in different periods of use is different, according to the intervals of time separating them, to external circumstances, and to the subjective condition of the user. The degree of actual utility of a usable commodity is more interesting than that of a consumable commodity, because, being durable, we may consider how its average value differs for each addition to a stock of the commodity. If a man be riding a bicycle, a second bicycle can have no actual utility to him, unless he can derive pleasure from it by lending it to a friend. There are, however, some usable commodities which do not require to be used in one fixed quantity only. If we may consider chairs in use when they are merely standing about the house in positions where they are likely to be wanted, and where they may perhaps have some ornamental rôle to fill, then such chairs may be

used in a house in almost any number up to a certain limit. Let us suppose, for instance, that there are thirty-six chairs in a house of modern size. Chairs are not absolutely necessary to life, but they are extremely convenient; consequently the first chair introduced into the house has a high degree of utility, though not an infinitely high degree. The second chair is not quite so necessary as the first—it would not be in use quite so often—

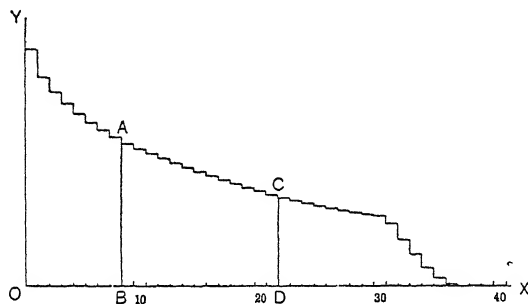


Fig. 14

and so it has a slightly less degree of utility than the first, though still a high degree. The third has a somewhat less degree of utility than the second, the fourth less than the third, and so on. The stepped curve in fig. 14 shows the degree of actual utility of each chair in the house, considered as the last addition to the stock. The number of chairs in stock is shown along  $OX$ , whilst the height of each step above the base-line  $OX$  shows the degree



of actual utility of the corresponding chair. It will be noted that each chair has a lower degree of utility than the preceding one, but that the difference is greater between the degrees of utility of early additions to the stock than between those of later additions. The difference between one's desire for a second chair and a third, or for a third and a fourth, is greater than the difference of intensity with which one wants a seventeenth and an eighteenth. When the chairs become numerous one more or less does not much matter. The rapid fall of the end of the curve has been put in to make it realistic. It is assumed that thirty chairs is about the largest number that the house will conveniently hold, so that the degrees of actual utility of any chairs added beyond that number will be considerably lowered by their taking up valuable space.

### *Final Degree of Utility*

The curve of fig. 14 shows the degree of actual utility of each chair as it was added to the stock—in other words, the intensity of desire for another chair which prompted the successive addition of each one. At the time when only seven chairs existed in the stock the intensity of desire for another, or the degree of utility of an eighth, was that shown by the height of the eighth step; when there were 20 chairs the degree of utility of the twenty-first was

that shown by the height of the twenty-first step, and so on. This leads to the explanation of the meaning of a useful term: *final degree of utility* (F.D.U.). The final degree of actual utility of a stock of commodity is the degree of actual utility of the last small addition to the stock. For example, when the eighth chair had been added to the stock, the final degree of actual utility of the stock of eight chairs was the degree of utility of the eighth chair, represented by AB in fig. 12. Similarly, when the twenty-first chair had been added, its degree of utility, represented by CD, was the final degree of actual utility of the stock of 21 chairs.

It is evident from inspection of the figure that, the larger the stock of chairs grows, the smaller becomes its final degree of actual utility. This principle is of great importance, as it has an almost universal application, to all human beings, and to all commodities. It must be a familiar experience to everyone, man, woman, and child, that the more one has of a thing in stock the less does one want to have more of it. If you have a dozen pairs of gloves ready to be worn, you are not so desirous of obtaining another pair as if you have but one left. The house-wife who has a large stock of cutlery is not so anxious about whether she can afford to buy a few more knives as the dame whose small stock barely suffices to set the table. The principle applies also with equal force to prospective utility,

and it will be mentioned again when the discussion of the latter is reached.

In the definition it was stated that the last addition must be small if its degree of utility is to be taken as the final degree of actual utility of the stock. In the case of indivisible commodities, such as bicycles and chairs, the last addition cannot be less than the whole of one of the articles in question. It must not, however, be more. Divisible commodities, which may be subdivided to the minutest portions without loss of utility, are of a different nature, and the last small addition to a stock of one of them may be very small indeed, the smallest amount which could conceivably be handled. Some economists would make it infinitely small, and perhaps this view is the more theoretically correct. It is of interest to observe that, in the case of divisible commodities, the degree of utility of the last small addition to a stock is practically the same as, or only to the very slightest extent larger than, the degree of utility of the next small addition to the stock; and this latter degree of utility represents the urgency of desire for more of the commodity. This relation does not hold in regard to indivisible commodities, because there may be very considerable differences between the degrees of utility of successive additions to the stock.

### *Average Degree of Utility*

The curve of fig. 14 (repeated in fig. 15) does not represent the actual utility of the stock of chairs at any one time; it merely shows the individual degree of utility of each successive addition to the stock. When once a chair forms part of a stock its individuality is lost, supposing all the chairs to be of exactly the same kind, and its degree of utility

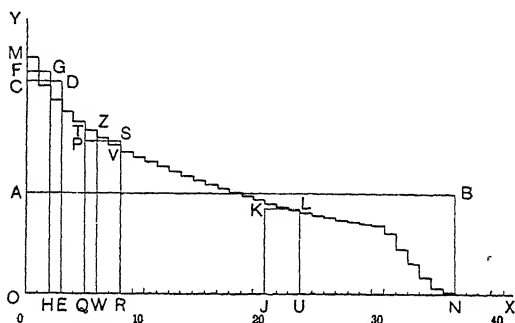


Fig. 15

can be no greater than that of any other chair in the stock. In general we may say that a stock of any commodity possesses an *average degree of utility*, which is the same for every constituent part of the stock, and which may be taken as the arithmetic mean of the degrees of utility of the successive equal-sized additions to the stock. In other words, every part of a stock of commodity

must have the same degree of utility, and this may be found by adding together the degrees of utility of all portions added to the stock from the beginning to the end, and dividing by their number, the portions being supposed equal in size. The height of the broken line AB in fig. 15 above the base-line OX represents the average degree of utility of the stock of 36 chairs, and it has been found by the method indicated. It should be noted that, in finding the average degree of utility in this way, the successive additions should be thought of as made almost simultaneously, so as to test a person's feelings at any given moment. If this were not done, the earlier additions might have altered in their degrees of actual utility before the later ones were added, because a person's intensity of desire for a commodity is by no means always stable.

### *Amount of Utility and Total Utility*

An amount of feeling we found was measured by the intensity of feeling multiplied by the length of time for which it lasted. It is thus a quantity of two dimensions. If a certain amount of commodity possess a certain degree of utility, that portion of commodity is also possessed of an *amount of utility*. An amount of utility is a quantity of two dimensions, because it is the product of a quantity of commodity

and its average degree of utility. It therefore varies both with a change in the quantity of commodity and with alteration of its degree of utility. An amount of utility is represented by an area, whereas degree of utility and quantity of commodity are both represented by straight lines. The amount of utility possessed by a stock of commodity is often, for the sake of brevity, called its *total utility*.

Returning to our illustration of the chairs, it is easy to see from fig. 15 that the total utility of a stock of three chairs, represented by the rectangle CDEO, is greater than the total utility of a stock of two chairs, represented by the area FGHO. In this case the difference of total utility is due mainly to the difference in quantity of commodity, though there is necessarily a slight difference in the average degree of utility of the two stocks. On the other hand, the amount of utility obtained by adding three chairs to a stock numbering twenty is obviously much less than that obtained by adding three chairs to a stock consisting of but five, for the rectangle JKLU, representing the former, is much smaller than the rectangle PQRS, which represents the latter. In this case the difference is entirely due to the great difference in the average degrees of utility of the additions to the different stocks.

In the foregoing illustration rectangular areas alone have been taken to represent amounts of

utility, for the sake of simplicity. It is usually more convenient, however, to take an area bounded on one side by the curve. Thus the total utility gained by the addition of three chairs to a stock of five is shown by the area of the figure TQRVZ, as well as by the rectangle PQRS. This is easily seen to be true when it is remembered that the total utility added with each chair is shown by the long, narrow, rectangle standing beneath the step belonging to it. Thus, the rectangle TQWZ represents the amount of utility gained with the sixth chair, and so on. The total utility of the whole stock is shown by the area of the figure MONVZ, enclosed between the curve and the two axes, quite as well as by the rectangle AONB.

It is thus clear that the total utility of a stock of commodity or any portion of it, may be arrived at by two different methods: either by multiplying the whole quantity of commodity considered into its average degree of utility, or by adding together all the small rectangles representing the total utility of the separate additions to the stock. It might be thought that the latter method was applicable to indivisible commodities only, because it is for them only that the curves are stepped, and for them only that rectangles may be recognised, each corresponding to a single article. Such is not the case, however, for, though the curves of divisible commodities are smooth, it is easy to assume that the area

representing the total utility of a stock is composed of a very great number of narrow rectangles corresponding to exceedingly minute additions to the stock. Thus, by making the additions smaller and smaller, as in the curves for a divisible commodity in fig. 16, we make the steps smaller

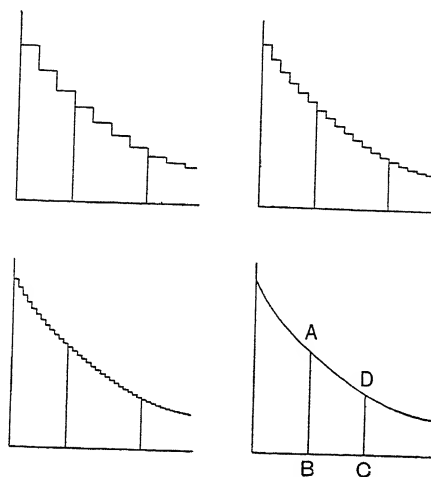


Fig. 16

and smaller, until we pass by insensible gradations into a smooth curve. The integral calculus supplies a method of determining the area of any figure bounded on one side by a curve, such as ABCD in fig. 16.



*Prospective Utility of Usable Commodities*

Attention may now be turned to the prospective utility of stocks of usable commodities. The degree of prospective utility which attaches to any portion of commodity depends solely on the intensity of anticipial pleasure which it produces in the person who expects to use it. The causes which govern intensity of anticipial pleasure (see page 82) will act with exactly equal force upon degree of prospective utility. The degree of prospective utility produced by the anticipation of the use of a usable commodity will therefore depend upon, (1) the amount of pleasure anticipated, (2) length of time expected to elapse before use of the commodity, (3) the probability of use of the commodity really taking place. If one's feelings with regard to the use of a bicycle, a horse, a camera, a gun, a fishing rod, or any article which one uses occasionally for the sake of pleasure, be analysed, the foregoing statement of the factors which influence the degree of prospective utility may be easily confirmed. One 'values' any such commodity, that is, its degree of prospective utility varies, precisely according to the amount of pleasure which one expects to get out of it.

The intensity of feeling at any one time is really the sum of the intensities due to the anticipation of a great number of periods of use of the article,

each one of which varies according to the three factors mentioned. Hence the degree of prospective utility of a portion of usable commodity depends, firstly, upon the amount of pleasure expected from each period of use of it; secondly, upon the shortness of time expected to elapse before the anticipated amount of pleasure can be enjoyed—in other words, upon the frequency of the expected periods of use; and, thirdly, upon the probability of the expected periods of use really taking place, which depends upon considerations of weather, health, and a variety of other circumstances which cannot be foretold.

The results of the above analysis of the factors which influence the degree of prospective utility of a portion of commodity may be applied to successive increments to a stock of a commodity. It is evident that the degree of prospective utility of each addition to a stock will be less than the preceding one, because, though each might produce the same amount of pleasure when used, the later addition would be regarded as likely to be wanted less often than the preceding one, and the probability of its being used at all would be less. / Curves representing the degrees of prospective utility of additions to a stock of a usable commodity will therefore have much the same shape as the curves of actual utility. Probably they have exactly the same form, but are proportionately lower throughout. / The degree of prospective utility of each addition will be less than

its degree of actual utility, because the anticipipal pleasure of an event is always less than its present pleasure; and probably less in the same ratio. Using the chairs once more as an illustration, the diagram (fig. 17) has been drawn to show the curve for prospective utility, AC, in its relation to the

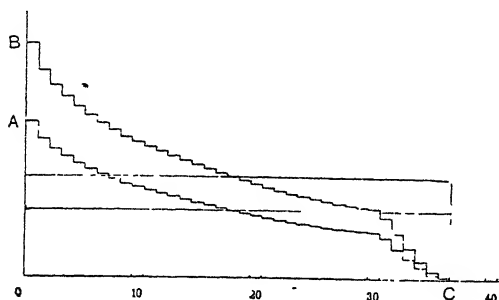


Fig 17

curve for actual utility, BC. The degree of prospective utility has been assumed to be two-thirds of the degree of actual utility for every addition, so that the curve AC is throughout only two-thirds the height of the curve BC. The average degree of prospective utility of the whole stock of chairs is obviously also equal to two-thirds of the average degree of actual utility; and the total prospective utility likewise is equal to two-thirds of the total actual utility, as shown by the ratio of the areas AOC and BOC.

Whether the ratio of the degree of prospective utility to the degree of actual utility is ~~two-thirds,~~ or is greater or less, is a question whose answer depends entirely on the temperament of the person in question. In few cases is it likely to be more. in the majority less

### *Prospective Utility of Consumable Commodities*

Consumable commodities are essentially different from those of usable nature in regard to the amount of prospective utility which attaches to them, and the difference is due to the fact that the former are destroyed in the act of giving pleasure, whilst the latter are not. A stock of usable commodity may very well be so large that additions to it would have no actual utility: in this case such additions would also have no prospective utility. Stocks of consumable commodities, on the other hand, are nearly always so large that additions to them would have no actual utility; in other words, there is more of them on hand than could be consumed in one period. Yet additions to such stocks of consumable commodities may well have a high degree of prospective utility, because they are likely to be required for consumption in the near future. Stocks of consumable commodities

therefore are usually much larger than stocks of individual usable commodities, and a great part of industry and commerce is devoted to replenishing them as they are diminished by consumption.

*Law of General Decrease of Final  
Degree of Utility*

The degrees of prospective utility of portions successively added to a stock of consumable commodity decrease according to the same law as has been established for usable commodities (page 49). Each successive addition to the house-wife's stock of tea would have a less degree of prospective utility than the last, because the moment of its consumption would be more remote and a future event is anticipated with less intensity of pleasure the more remote it is. The probability of the additional portion being required for consumption would also be less the larger the existing stock, though this factor would not have so great an influence in the case of a commodity in daily consumption like tea as it would in the case of commodities like cochineal or rennet wanted by most people but once in a few weeks.

The degrees of utility of successive additions to a stock may be shown for consumable commodities, in the same way as for usable commodities,

by curves. For example, the curve in fig. 18 shows the degrees of utility of successive additions of single ounces of tobacco to a man's stock, supposing him to start with none at all. As before, degree of utility is shown by the vertical height above  $OX$ , whilst quantity of commodity is represented by distances measured to the right from  $OY$ . Each step, therefore, represents one ounce. Tobacco

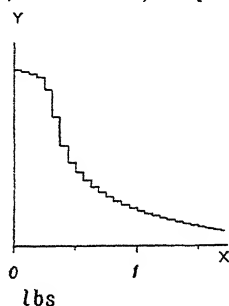


Fig. 18

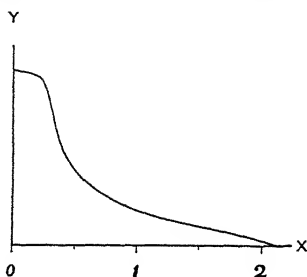


Fig. 19

being a divisible commodity, there is, however, no reason why we should suppose it to be added in ounces, rather than in any other quantity; and it may indeed be added, or conceived of as being added, in such minute quantities that the steps become too small to be seen, and the curve becomes practically a continuous line, as in fig. 19. It will be well to point out here, once for all, that utility curves of indivisible commodities are always stepped, and that those of divisible commodities are always drawn smooth.

The shape of the curve in fig 18 is of some interest. It begins high, showing that a small quantity of tobacco has a great degree of prospective utility to the man for whom the curve is drawn and it falls, but not very fast at first, showing that he considers a stock of three or four ounces essential, or at least that he would begin to be a little troubled if his stock were less than that amount. Then the curve falls faster, for the desire to have a larger stock becomes rapidly less after the man is possessed of about four ounces. When about ten ounces are in stock the degree of utility of subsequent additions is small, and the curve begins to fall slowly, as an ounce more or less to a large stock does not make very much difference. Finally, when the stock is something over two pounds, further additions would have no utility whatever, and the curve has therefore fallen to the base-line at this point.

It is not always the case that the degrees of prospective utility of additions to a stock decrease as the stock grows larger. Putting aside cases of mental aberration, in which the possession of great wealth seems only to lead men to greater efforts to obtain more, and the possible exception of a man endeavouring to organise a 'corner,' which will be referred to later, the law of decrease may probably be regarded as universally true excepting for very small quantities of divisible commodities. Let there

be but half a teaspoonful of tea left in the caddy when the hostess wants to make tea for a party of six. To make it with this quantity would be a mockery, and so the degree of utility is very small indeed for a stock of this quantity. If another half-teaspoonful be found, the situation is somewhat mended, because one teaspoonful might make a small cup of weak tea for each person. The second half-teaspoonful, since its addition renders the making of tea possible, must be regarded as having a higher degree of utility than the first. If a third came to hand it would have a very high degree of utility, because it would make the tea approach a little nearer to normal strength; but it is doubtful whether its degree of utility would be quite so high as that of the second, which had the advantage of making the consumption of tea possible. It may be objected that, in this illustration, we are dealing with actual utility, because the tea is for immediate consumption; but, if this be admitted, the example also shows that a very small stock would have a very low degree of prospective utility. Man's body is of such a nature that it requires a certain quantity of commodity before any pleasure can be gained from its consumption. Small portions added to bring the quantity up to that required for one period of consumption will therefore have increasing degrees of prospective utility. This principle is illustrated by the curve in fig. 20, which may be taken to represent tea, the divisions on the line OX denoting



half-teaspoonfuls. The curve has not been started from zero, it being supposed that the smallest quantity would have some degree of utility, because there would always be the possibility of more being added to it.

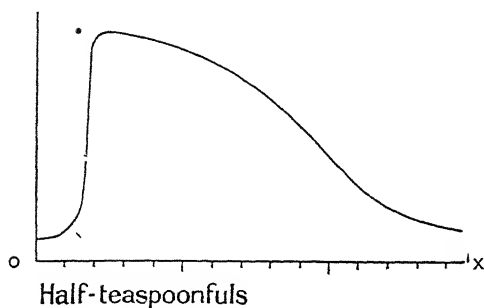


Fig. 20

It would not be correct to begin with prospective utility curves of all commodities low, and let them rise before falling. Each must be considered on its merits. For example, most indivisible commodities, usable or consumable, such as tables, bottles, apples, eggs, fireworks, etc., can be represented only by stepped curves, and the degree of utility of the first of any of these articles is generally greater than that of the second and succeeding ones. On the other hand, the first knitting needle would have less utility than the second, which made knitting possible. The curves of divisible commodities will, in general, start by rising; but there are exceptions, as, for example,

lubricants, which, even in the smallest quantity, may do more good, proportional to the quantity used, than when applied in larger quantity.

The degree of prospective utility of the last small addition to a stock is called its final degree of prospective utility, in the case of consumable as of usable commodities. The *law of general decrease of F.D.U* may therefore be conveniently stated in the following words: for any one person, -at any one time, and without change of circumstances, the final degree of prospective utility of a stock of consumable commodity generally decreases as the size of the stock increases. Time and circumstances may alter degree of utility, as will be fully explained in the following sections; hence the necessity of the qualifying phrase.

### *Average Degree of Prospective Utility, and Total Prospective Utility*

A stock of commodity, or any portion thereof, has an average degree of prospective utility precisely analogous to its average degree of actual utility, and an amount of prospective utility, or total prospective utility, also analogous to its amount of actual utility or total actual utility. Both are measured in the way which was described for actual utility, and this need not be repeated here. It is only necessary to point out here

that the two quantities, average degree of prospective utility and total prospective utility of a portion of commodity, are conceptions of extreme importance in the theory of exchange, for by them are determined the limits within which must lie the ratio of exchange

A point of interest is to be found in the relation of the average degree of prospective utility of a

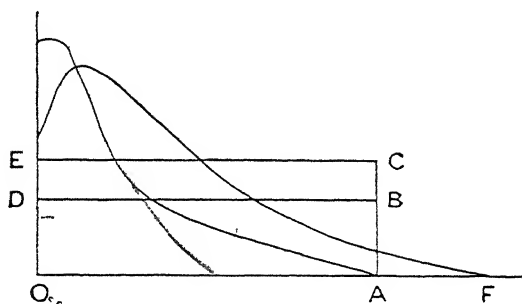


Fig. 20A

stock of consumable commodity to its average degree of actual utility. It has been stated already that stocks of consumable commodities are frequently so large that additions to them can have no actual utility, although they may have considerable prospective utility. In other words, the curve of actual utility for a consumable commodity reaches the base-line much sooner than the curve of prospective utility, as shown in fig. 20A. The result is that the average degree of prospective utility of a fairly large stock, such as AO in fig. 20A, may be

larger than its average degree of actual utility, because so large a part of it has no actual utility. Thus the length of the vertical line AB may represent the average degree of actual utility of the stock OA, and the length of the longer line AC its average degree of prospective utility. The total actual and total prospective utilities are shown respectively by the rectangles OABD and OACE.

### *Causes of Variations in the Shapes of Prospective Utility Curves*

Prospective utility curves vary very much in form, and it is very instructive to note the variations, and find the causes with which they are connected. There are, altogether, four independent and variable factors of importance upon which the shapes of utility curves depend:—

- (1) The tastes of the person for whom the curve is drawn;
- (2) The commodity for which the curve is drawn;
- (3) The environment of the person with regard:
  - (a) to other persons,
  - (b) to other commodities;
- (4) The association of the commodity with complementary commodities.

Change in the shape of a utility curve will almost invariably be accompanied by some alteration in the total utility of the stock it represents, or any portion

of it. The causes of variation of curves just enumerated may therefore be applied with nearly equal force to account for those changes of total utility of a portion of commodity which are so common in every day life. The variations of curves and their causes will now be discussed in detail, because a general knowledge and understanding of them is of vital importance for the progress of economic science. Needless repetition of the word *prospective* is avoided in the sequel by attaching to the word *utility* the meaning *prospective utility*, whenever it is not qualified by the word *actual*.

### *Variation of Curves for Different Persons*

It is a matter of universal experience that the tastes of no two persons are exactly alike, and, indeed, that, with regard to a host of articles of use and consumption, the greatest variety of preference exists. It is not necessary here to investigate the reasons for differences of taste: how far they are due to natural organic variation, and how far to education and environment; the economist is content to accept the fact that such differences exist.

If to the variety of tastes be added the fact that different individuals have different powers of anticipation, as has already been stated at length (page 66), a sufficient explanation is obtained of the variation of utility curves of the same commodity

for different people. One or two examples may be quoted to illustrate the nature of the variations of curves for different people.

A comparison of the curves of two men for tobacco is a simple case. Let us suppose that A is a great smoker, consuming a pound of tobacco in a fortnight. To be altogether without tobacco is perhaps for him little less than a catastrophe, a contingency to be guarded against with the utmost forethought and pains. He will, therefore, never be content whilst he has less than about half a pound of tobacco in the house. His curve, fig. 21, will

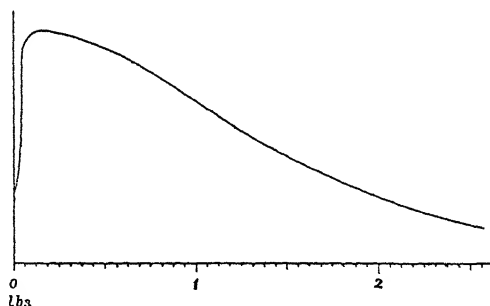


Fig 21

therefore rise rapidly from a low degree of utility for a very small quantity to a very high degree of utility, a maximum, say, for the quantity required for a day's smoking; and then fall slowly until the quantity in stock is half a pound. The degree of utility of additions to his stock is still, at this

quantity, very high. We may assume, however, that our subject is a man who does not anticipate with great intensity; who is quite content with living rather from hand to mouth, at any rate in the small affairs of life. Additions to stocks of over about half a pound will therefore have increasingly less degrees of utility the larger the stock: in other words, the curve will be falling more and more rapidly, and so it will be convex upwards. After a pound is in stock additions begin to have much the same degree of utility: the curve therefore begins to fall less rapidly, and is concave upwards. The degree of utility continues to fall as the stock gets larger; but there is less and less difference between successive additions, and so the curve gets flatter and flatter. Many pounds would have to be in stock before there was no utility whatever in further additions, so that the curve does not quite reach the base-line within the limits of the figure.

The other man, B, we may regard as a moderate smoker, one accustomed to smoke a pipe once or twice a day, but not much discomfited if he is obliged to forego it occasionally. A very small quantity might be to him of comparatively greater use than to A, so that his curve (see fig. 22) rises sooner at the beginning. A quantity sufficient for a few smokes has a moderately high degree of utility, but not nearly so high a degree as it has for A, because he does not so much mind going without.

Let us suppose B to be a man of keen anticipation, who always likes to feel that he has enough of a commodity in stock to last him some weeks. The curve will therefore fall but slowly, until it reaches the point which denotes one pound in stock. After that it may fall a little more rapidly, and then more slowly, for reasons similar to those in the case of A.

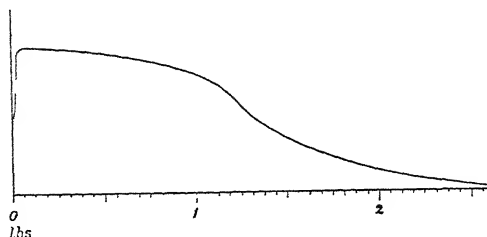


Fig 22

A comparison of the curves for A and B shows that they have much the same general form, differing only in their elevation above the base-line, and in detail. A like relation probably holds between all the curves of one commodity for different people. They have the same general shape, which is dependent on the properties of the commodity; but vary infinitely in the pitch of the curve at corresponding points, and in average height above the baseline.

It will be noted that here it has been assumed, contrary to the prevailing acceptance, that utility curves for different people can be compared. That



they cannot be compared with mathematical exactitude at present is obvious, because there are no numerical data upon which to found the curves. That is why the two curves were not drawn on the same axes. At the same time, it is equally evident that a rough general comparison can be made. Each man, by analysis of his own feelings can draw a curve for himself, showing the relative F. D's. U. of stocks of different sizes, and perhaps a basis for the comparison of the curves of different people for the same commodity may be found in the proportion which the average amount of pleasure derived from the consumption of a certain fairly large quantity of the commodity bears to the total amount of pleasure experienced by the person from the whole of his use or consumption of all articles during the period taken to consume the certain quantity of the commodity in question. If a usable article were in question, the comparison would simply be between the average amount of pleasure derived from its use during a period of fair length with the average total amount of pleasure derived from the use or consumption of all articles during a period of the same length. For example, in the case just considered, the ratio of A's amount of pleasure derived from smoking, to his total amount of pleasure derived in the same time from all kinds of use or consumption, would be much greater than the same ratio for B and we are justified in making A's

curve for tobacco correspondingly greater in average height than B's.

For another curve for tobacco c.f. fig. 19 *antea*

Another example relating to usable commodity may be briefly referred to. Let the curve in fig. 23 represent the degrees of utility of successive

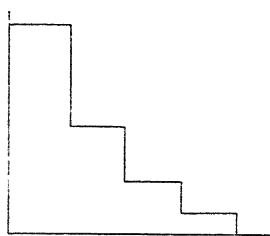


Fig. 23

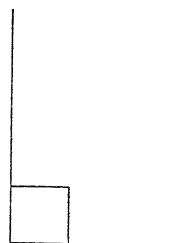


Fig. 23A

additions to a musical amateur's stock of pianos. The degree of utility of the second piano is but little less than that of the first, because he is fond of playing duets for two pianos. The third is very useful for practice in another part of the house, and so its degree of utility is high; but a fourth, which might only be used very occasionally for a trio on three pianos, for a few such pieces exist, or otherwise, would have only a low degree of utility. A fifth would have no utility whatever.

On the other hand, there are very good and estimable persons, who think it necessary for the

sake of appearances to have a piano in the house, though they do not care one jot about having it played. For such people there is no difficulty in drawing the curve, fig. 23*a*, which will extend to one piano only.

### *Variation of Utility Curves for Different Commodities*

The second way in which utility curves differ from one another is the result of the physical properties of the commodities themselves. Commodities differ greatly in a variety of ways, one or two of which we may select for study.

The effect of the principle of unequal quantities (described on page 58) on the utility curves is to make the curves of those commodities of which much is required to produce a unit of pleasure fall more slowly than those of which little is required. As an

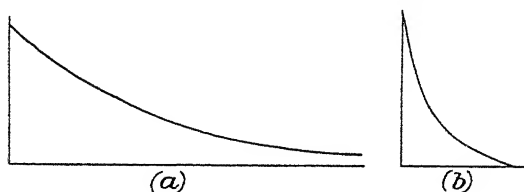


Fig 24.

example we may compare the curves for coal and salt for an ordinary house-keeper, which are illustrated in figs 24, *a* and *b* respectively. So much

more of coal must be kept in stock than of salt, that if the horizontal scale of the curves be the same, and if both commodities be measured by the same unit, say pounds, it is hardly possible to extend the coal curve to meet the base-line. It would require some hundreds of times as much coal as salt to bring its F.D.U. down to nothing.

The liability to deterioration to which some commodities are subject in much greater degree than others has a potent influence on the shape of

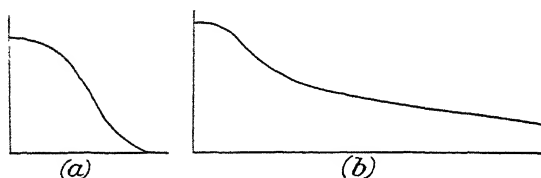


Fig. 25

utility curves. If we compare the curve of a perishable food, like meat, with that of one comparatively imperishable, like flour, drawing them on the scale for equal weights, we find that the curve for the perishable article always falls for the same person much the more rapidly of the two, for it would be useless for any one but a dealer in it to keep a large quantity of it in stock. The curves for meat and flour of a person living in the country who bakes his own bread are shown in figs. 25, *a* and *b* respectively.

The curves of all usable commodities tend to fall fast, for little need be kept in stock of a thing which is not destroyed in giving pleasure. The curves of consumable commodities, on the other hand, fall slowly unless there are special circumstances which determine otherwise, and excepting in the case of rapidly deteriorating commodities. We may select, as an example of a curve for a non-deteriorating usable commodity, that for 'plasticine' modelling clay which is drawn in fig. 26 (a). It falls at first rapidly, because

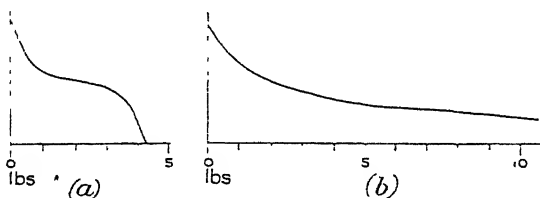


Fig. 26

modelling may be practised with a very little; then slowly; and, finally, more quickly when the limit is reached of what would ever be likely to be wanted. The curve for tea, which is a non-deteriorating consumable commodity, is shown in fig. 26 (b), and, by comparison with that for plasticine, it falls very slowly. There is, indeed, hardly any limit to the quantity of tea which might be stored in a large house without its F.D.U. reaching zero.

It was necessary, for the sake of illustration, to choose plasticine as an example of a usable commodity rather than something in more common use, for comparison would have been difficult had not both commodities been divisible, and usually measured by weight. A moment's consideration reveals the curious fact that there are very few divisible usable commodities at all in daily use; and that, on the other hand, indivisible consumable commodities are not very common. The curves of all indivisible usable commodities tend to fall rapidly but, as such commodities are usually measured by number rather than weight, there is some difficulty in comparing their curves with others.

*Environment of Person as regards Other  
Persons—*

*Exchangeability of Commodities*

The variations of utility curves due solely to the differences in the environment of a person as regards other persons—that is to say, in the accessibility of other people—are of the greatest significance. We shall find it convenient to speak of a person as being in *isolation*, if he be cut off from intercourse with all other people, as, for example, a castaway on a desert island. On the other hand, a person will be said to be in *society*

if he be situated in a town of some size, so that a great number of people are readily accessible to him. It may be noted that a man is in society in a town, only when the majority of people are awake: at dead of night he may be in a state of semi-isolation

In the essay on Exchange will be found a brief explanation of how utility is gained by both parties when an exchange is effected. The gain of utility by one transaction is frequently very considerable—anything up to two or three hundred per cent perhaps, if an estimate may be hazarded. It is obvious, therefore, that if a man live in a place where he may readily exchange a thing which he possesses for a portion of any commodity which he wants, the thing itself possesses a certain amount of utility merely in virtue of its exchangeability, and quite apart from the utility which it possesses by reason of such power as it may have of causing pleasure by acting directly on the senses. Utility of the latter kind it is convenient to call *direct utility*, and that which originates solely in the exchangeability of the thing is termed *acquired utility*

The effect of a man's environment on the shape of his utility curves becomes evident when a few examples are considered. A man in isolation will always find utility in further additions to a stock of imperishable food, such as flour, biscuits,

tinned meat, or dried fruits, no matter how large it may be: in other words, his curve for any such food falls very slowly indeed, as, for instance, in fig. 27 *a*. It must also begin at an infinite height above the axis  $OX$ , for we regard such food as is necessary to preserve life in the immediate future, before there is any hope of relief, as having an infinite degree of utility. The same man's curve for such food if

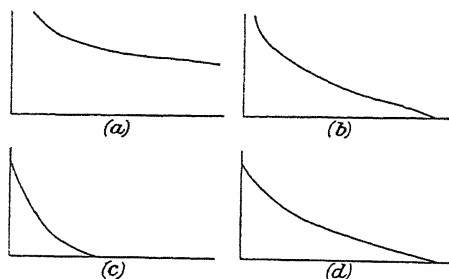


Fig 27

he were in society would be very different. Other things would be exchangeable for food whenever he desired, so that there would be little use in keeping a large stock of it. The curve, therefore, would fall more rapidly, as in fig. 27 *b*.

The case which we have just considered was one of necessary food. The effect of change of environment on the curve of luxury is exactly opposite, for the curve is raised and extended, instead of being lowered and shortened. Let fig.



27 *c* represent the curve of pepper or mustard for a man in isolation. He wants so little himself that any addition to a stock of a few pounds could have no utility whatever. If he were in society, however, any surplus of pepper or mustard which he could not hope to consume himself would still have prospective utility, because it would be exchangeable with little difficulty for something else which he did want. His curve for pepper or mustard in society (fig. 27 *d*) is therefore higher and longer than that for the same thing in isolation.

The similarity of the two curves in society (figs. 27 *b* and *d*) in shape, apart from size, is no mere accident. Were every article perfectly exchangeable for every other, there would, indeed, be no difference in the shapes of their utility curves, for it would be a matter of indifference what a man possessed, when by exchange he could instantly obtain what he wanted. There is thus a strong tendency in society for the utility curves of all commodities, money included, to become similar to one another in shape; and the more perfect is the organisation of exchange the more marked is this tendency.

A very interesting extension of this principle is found in the case of a merchant—that is, a man who makes a living by buying and selling one or more commodities. For a man who makes the selling of boots his business, for instance, boots are eminently

exchangeable, but anyone else might find it impossible to dispose of a pair of boots, even if new, except at a great reduction upon the shop price. The curve of any commodity for a man who is accustomed to deal in it is greatly raised (because it becomes as exchangeable as money), and it is also greatly lengthened

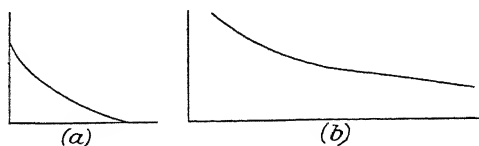


Fig 28

As an example, let us choose a luxury, say curry-powder. The curve of a man in isolation for curry-powder would be small, as in fig 28 *a*; but if

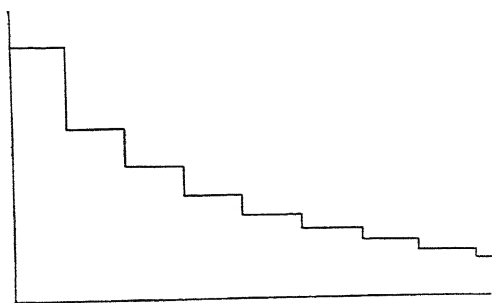


Fig. 29

he became a merchant dealing in curry-powder his curve for it would be both raised and extended, as

in fig. 28 *b* For another example we may take the case of a dealer in pianos. His curve for them would be somewhat as shown in fig. 29, and it is instructive to compare this curve with those for pianos contained in fig. 23 (page 130), which are drawn on the same scale

*Environment of Person as regards Other  
Commodities—  
Equivalent Commodities*

Any two commodities whose physical properties are such that one gratifies the senses in much the same way as the other are said to be equivalent. Mutton and beef, for instance, are two almost perfectly equivalent commodities, if one becomes scarce more is consumed of the other, and vice versa. There are very few of the commodities with which man surrounds himself which are not capable of being to some extent replaced by another. Oats or rice, at a pinch, will do instead of wheat, saccharin instead of sugar, wood or bone instead of iron, celluloid instead of ivory, and so forth.

The utility of a commodity to a person is at once decreased when he becomes possessed of a substitute; and the more perfect the replacement the greater is the fall of utility. The acquisition of a portion of commodity perfectly equivalent to one already possessed might indeed be regarded as a

mere increase of the stock of the latter, for as regards utility the two would be indistinguishable. If, however, they were kept separate, their curves would be shaped exactly alike.

An equivalent commodity must lower the curve of its fellow for any person whenever it is in the latter's possession, or within his reach by exchange. The extent of the lowering depends in part upon the perfection of the replacement, in part upon the quantity in possession, or available by exchange. The quantity of the equivalent commodity within reach affects the height of the whole curve—not only of a part of it. This becomes clear if the effect, upon the degrees of utility of successive additions, of the existence of a fixed stock of an equivalent commodity be considered. The degree of utility of the first portion, and of each successive portion, is evidently less than it would have been if there had not been an equivalent commodity available; indeed, we may now regard the curve as starting from a point some way down its former self, i.e., the same curve when there was no equivalent commodity accessible.

The effect, upon a man's utility curve for a commodity, of the discovery that another commodity has properties equivalent to it, is to lower the curve of the former, and raise that of the latter. For instance, if, in fig. 30, diagram *a* represents the utility curve of commodity A before the discovery

that commodity B has equivalent properties, and diagram *c* represents the curve of commodity B at the same time, the curves of the two commodities after the discovery of the equivalence is shown by diagrams *b* and *d*. The replacement has been

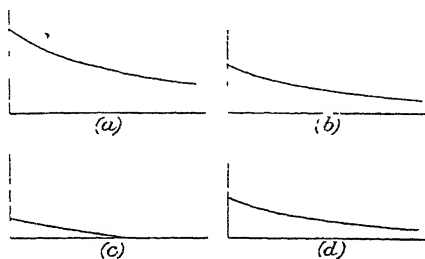


Fig 30

assumed to be so nearly perfect that the curves are nearly the same. If some such mineral as monazite were found to yield radium to the same extent as pitch-blende, the utility curve of pitch-blende would be very much lowered, and that of monazite raised.

### *Association of Commodities—Complementary Commodities*

The Environment of a commodity as regards other commodities is sometimes a matter of importance, which affects its utility considerably. Bread has much less utility without butter than with it, for it can give but little pleasure in being eaten without it; and butter also has little utility without bread on which to spread it. Similarly, a

railway carriage is of little use without a locomotive to move it; and the utility of an engine is seriously reduced if there be no trucks or cars for it to pull. All such pairs, or groups, of commodities, whose utility is reduced if they be not associated with one another, are called complementary.

There is a certain proportion in the quantities of the commodities in stock in which each of a group of complementary commodities has the highest utility of which it is capable, and if there be an excess of any one commodity—in other words, if the others be deficient—the total utility of the stock of it is lowered, and a part of its utility curve is lowered. If there be a deficiency of raw material for a machine, the utility of the latter is diminished; and, on the other hand, if there be an excess of raw material—such as a heavy crop of sugar cane—and a deficiency of machinery to handle it expeditiously, there is a diminution of the utility of the raw material.

Deficiency of a complementary commodity does not lower the whole curve, as does the presence of an equivalent commodity; because, if there be any of the complementary commodity left, the utility of so much of its fellow as would be consumed with this amount is not diminished at all. It is, indeed, only the lower parts of utility curves which fall owing to deficiency of a complementary commodity; that is, unless it be completely absent.

## IV

### LABOR

#### *Nature of Labor*

AN eminent philosopher has rightly said that everything which man achieves—all his civilisation—is attained merely by setting things in motion. If we go to the bottom of all kinds of manufacture, and of everything that men do, we find that, in reality, man does nothing but move things: he takes them from places where they are of no use to him, and puts them in places where they can be of use to him. Men take trees from the forest and saw them into planks; others take clay from pits and make it into bricks, and yet others bring the wood and bricks together, and build houses. In sawing, the saw and the saw-dust are moved; in lighting a fire to bake the bricks, the fuel must be moved to the right place, and the

striking of a match involves motion. In every action we merely move things, or parts of things.

All this motion must originally, in the first instance, be carried out by man's bodily muscles—the only things with which he has to work. In a later stage of civilisation man is able, by using his brains in conjunction with his hands, to make natural forces do the moving for him. Steam and electricity he harnesses in his service, thus vastly increasing in number and amount the things which he can set in motion.

The use of his muscles, or his brain, by a man is an exertion; and one form of exertion is that which we call labor, and which will form the subject of this essay. It should be borne in mind that, under the proper circumstances, mental exertion is to be accounted labor just as truly as is pure bodily exertion.

### *Pleasurable Exertion not Labor*

It is not all exertion that can be called labor in economics, because sometimes we exert ourselves solely for the sake of pleasure. If a man amuse himself by going a ride on a bicycle, for instance, he does a considerable amount of work—several foot-pounds, measured in the engineer's way; but yet in economics we cannot speak of that work as labor, because it is done solely for the sake of pleasure.



In other words, the pleasure which that man gains at the moment of exerting himself to propel the bicycle more than balances the pain arising from the exertion.

This example lends itself well to illustration by means of curves. As before, in fig. 31 intensity of

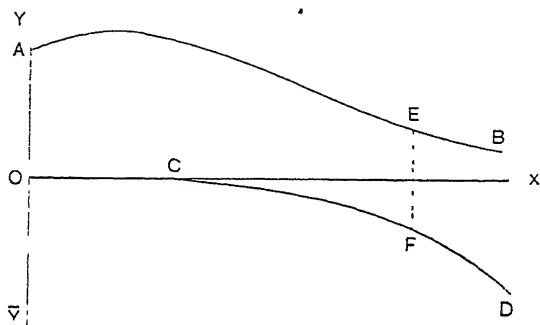


Fig 31

pain is represented by distance below the axis  $OX$ , and intensity of pleasure by distance above it. If we begin by tracing the pleasure curve  $AB$ , we notice that at first the curve must rise a little; for the pleasure which the cyclist derives will at first increase in intensity, as he begins to get accustomed to his exertion—becomes ‘warmed to his work,’ as we say. Then, as his ride continues, he begins to grow tired of the sensation of riding, and the pleasure which it gives him lessens in intensity. This is recorded in the figure by a fall of the curve, which,

however, does not quite reach the base-line in the time included in the figure. Considering next the pain curve CD, we must remember that exertion does not usually produce pain until it has been continued for some time; consequently, there is no pain to be recorded during the first portion of the ride. After the feeling of pain has commenced, it increases in intensity—at first but slowly, and then, as the cyclist begins to get tired, more quickly. This is shown on the diagram by the curve falling from C, at first gently, but afterwards more and more steeply. We may assume that the ride is being taken through flat country, so that the curve may be a smooth one, not rendered irregular by the climbing of hills.

After a while the pain of the exertion begins to exceed the pleasure derived from it; and, the moment the pain is equal to the pleasure, any ordinary human being will stop the exertion, if he is able. The moment at which this equality of the two kinds of feeling is realised is shown on the figure by the broken line EF. In drawing the figure the supposition has been made that the cyclist, not having reached home by this time, is obliged to continue his ride, although it now gives him more pain than pleasure. The balance of feeling derived from the ride as a whole, however, is pleasurable; as may be easily seen by comparing the area lying between the pleasure curve and the axes with the

area between the pain curve and the horizontal axis. The areas represent the amounts of feeling.

The foregoing illustration suggests an interesting remark as to the most perfect kinds of recreation. Sports, games, and outdoor exercise, are indulged in chiefly for the sake of gaining as much pleasure as possible\* from them. For this purpose walking, cycling and rowing, and even games such as cricket, football and hockey, are by no means perfect, because the subject is unable to stop at the exact moment when the intensity of pain has become equal to the intensity of pleasure. Unfavorable weather or an underestimate of distance, or of his powers of endurance, may prevent a man stopping in the former cases; and the wishes of others must be paramount in the case of games. Some detraction from the total pleasurable effect is therefore frequently suffered. The more theoretically perfect forms of recreation are those which allow each individual to cease playing as soon as he feels inclined; and perhaps some of the popularity of golf, and of pastimes such as gardening and photography, is due to the latitude they permit in this respect.

### *Definition of Labor*

Whenever a man exerts himself for the sake of obtaining anticipated pleasure—that is to say, whenever the present pleasure resulting from exertion is not sufficient of itself to overbalance

the pain which the exertion involves, and the anticipated pleasure of the things a man is producing by means of his exertion is necessary to stimulate him to work—then we may correctly call the exertion labor. In other words, labor may be defined as any exertion of body or of mind, which is undergone for the creation of commodities possessing prospective utility.

### *Intensity of Labor*

Labor may vary in intensity; for a man may work energetically or he may work easily. An analysis of the feelings of a man who is working, and of the results of his efforts, reveals the fact that labor has three kinds of intensity. To state the matter accurately, there are three correlative effects of a man's exertion, each one of which may be made to serve as a measure of the intensity of that exertion. These effects are:—

- (1) The intensity of pain caused by the exertion;
- (2) The rate of production of commodity;
- (3) The rate of production of utility.

It will be readily conceded that a man may be disposed to measure the intensity of his labor by the painfulness of the effort attending it: for instance, we commonly say that work is hard, i.e., intense, if it gives us much trouble, i.e., pain. Measurement by rate of production of goods—for example, the number of bricks moulded per hour—is also a

method so commonly adopted that it needs no comment. The notion of rate of production of utility—for brevity we may say *rate of utility-production*—is not quite so readily grasped: and it can be explained perhaps most easily by means of an illustration. Let us suppose a man to be making some thing which he himself consumes, and of which he has got but a small stock. He would then

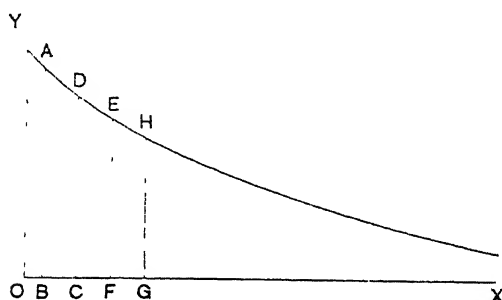


Fig. 32

measure his intensity of labor by rate of utility-production, rather than by rate of production of commodity. We may take, for instance, such work as making cigarettes by means of a little hand machine, and illustrate the production of utility by means of the curve fig. 32. Quantity of commodity is measured along OX, degree of utility along OY. Although cigarettes properly constitute an indivisible commodity, the curve has been made smooth to simplify the drawing.

We may assume that the man, when he starts work, has but a small stock of cigarettes—say five, a number which may be represented by the length OB. The degree of utility of the last addition to the stock (the fifth cigarette), in other words the F.D.U. of the stock, is shown by AB. If the man make ten cigarettes during the first five minutes that he is at work, these ten cigarettes, by increasing his stock to fifteen, will have the total utility represented by the area of the figure ABCD. The ten cigarettes made during the next five minutes will have a smaller total utility, represented by the area of the figure CDEF; whilst the next lot of ten cigarettes will have a still smaller total utility, shown by the area of the figure EFGH. It is obvious that, as the man continues making cigarettes, the total utility of each lot of ten is less than that of the last. As his stock grows larger, therefore, he is producing less and less utility in each succeeding five minutes, although in each five minutes he may make the same number of cigarettes: in other words, his rate of production of utility is decreasing, though his rate of production of commodity remains constant.

### *Curves of Intensity of Labor*

Much may be learnt by drawing curves to show how the different kinds of intensity of labor vary

whilst a man is at work. In fig. 33 let time be represented by lengths measured from (O) to the right along OX; let the rates of production of utility and of commodity be represented by distances measured

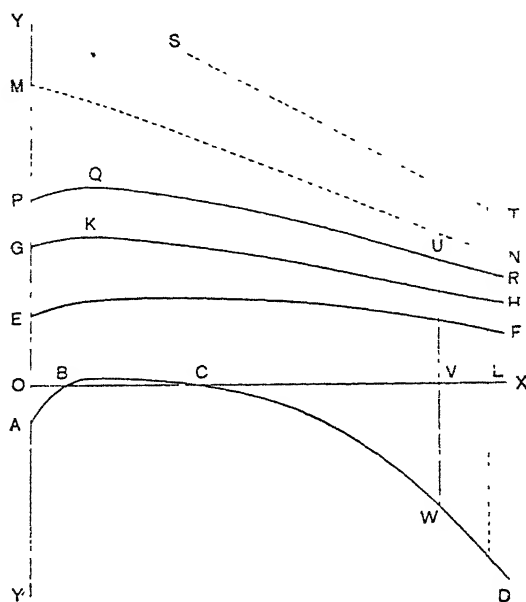


Fig. 33

vertically upwards from OX; and let the intensity of pain be shown by distances measured vertically downwards from OX. Considering first the rate of production of commodity curve, we may start it at the point E on OY, the length OE being assumed

to represent the rate of production at which the man begins work. For the sake of fixing attention, let us suppose the man to be working at some such trade as making bricks by hand. The workman picks up a lump of kneaded clay, and then turns out a soft brick, which a boy takes away to be dried. As the man gets warmed to his work he is able to make bricks somewhat faster than when he started; hence the curve rises somewhat at first. He then settles down to a uniform rate of work—and the curve remains practically horizontal—until he begins to tire a little, which results in a slight, but continuous, falling off in the rate of production, and a consequent gradual fall of the curve.

The course of the pain curve ABCD may be studied next. For a few minutes after starting the man probably experiences a slight degree of pain—mere annoyance at having to exert himself—which may be represented at the start by the length OA. This rapidly decreases, until, for a time, he actually finds pleasure in his work; so that the curve rises, and ~~from B to C~~ passes above OX ~~over~~ to the positive side. After a little while he begins to feel tired, and by degrees the continuous exertion becomes more and more of an effort: hence the curve of feeling passes to the negative side again, and falls more and more rapidly as the pain increases.

The rate of utility-production curve, GH, is not quite so easily traced. Let us suppose that the man



is working on his own account, and lives by selling the bricks he makes. Fig. 34 shows what we may take to be his utility curve for bricks. We may also assume that, at the beginning of the period under consideration, he already has a moderately large stock of bricks on hand, represented by OB on the figure; so that successive additions to his stock decrease but little in degree of utility. As his rate

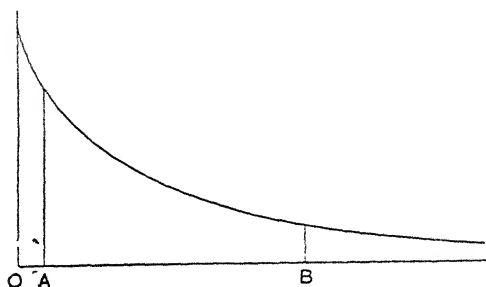


Fig. 34

of production of bricks increases a little at first, his rate of utility-production will also increase slightly, but not to the same extent, because of the continual decrease of the degree of utility of the bricks he is making. The curve rises, therefore, very gently from G to K (fig. 33). Later, when the rate of production of bricks is falling off, that factor, and the diminishing utility of successive additions, both tend in the same direction—towards making the rate

of utility-production decrease. From K to H, therefore, the curve falls somewhat rapidly.

### *Conditions affecting Shapes of Curves*

The size of the stock of the finished commodity on hand has a very striking effect upon the shape of the rate of utility-production curve, whilst the other curves are wholly unaffected by it. For instance, if the man were in poor circumstances, so that his utility curve for bricks started very high, as represented in fig. 34, and if he had but a small stock of bricks on hand, such as OA, each brick as he made it would have a high degree of utility; but the degrees of utility of successive bricks would fall off rather rapidly. The man would, therefore, be producing utility for himself very quickly at first, but more slowly later, because the F.D.U. of his stock would have decreased—would have reached (in fig. 34) a lower part of the utility curve. The resulting rate of utility-production curve is shown by the broken line MN (fig. 33); and it is interesting to notice that the increased rate of production of commodity is so far overcome by fall of utility, that there is no rise in this curve, as there was from G to K in the other curve.

Any cause which alters the man's utility curve for the commodity he is making will obviously affect

his rate of utility-production curve. Thus his environment—whether he be in isolation or in society—affects the exchangeability of his product, and thereby affects its utility. A farmer for instance, who works 200 miles from a railway, or navigable waterway, produces utility at a much slower rate than one who has easy access to the world's markets, so much of the utility produced being absorbed in the former case by the cost of transportation. A striking example of the effect of environment is to be found in comparing the rate of production of utility of a Chinaman working in his own country with that of the same man when he has emigrated to, say, Australia. He may be a carpenter, or a market-gardener, or be plying almost any trade—whatever his occupation, he is able to produce utility more rapidly in Australia than in China. His money-wages are, indeed, so very much higher in the former, that the excess more than counterbalances the difference in the purchasing power of money in the two countries. Probably this means that the final degrees of utility of people's stocks generally are lower in Australia than in China so that the money he earns is able to buy more utility. Certainly the environment of European civilization enables him by his labor to earn the material means of more enjoyment than does that of China.

Variations in shape of all the curves together are caused in two ways. Such variations are not

of much interest except in their applications to special cases; yet it may be well to specify them briefly in general form. In the first place, the curves are different for each person: firstly, because people usually work at different rates of production; secondly, because men are pained by the same work to different degrees; and thirdly, because each man has a different utility stock curve for each commodity. In the second place, the curves differ for each commodity made, or kind of work done; because different commodities have various physical properties. Taking the rate of production of commodity first, that may be said to be different for different commodities, because the latter have to be measured in different units. Considering, secondly, the pain curve, it is to be remembered that some modes of employment are much more tiring than others, so that the pain curves fall fast for them. Finally, the utility curves must have different shapes for things with different properties, and their shapes affect the shapes of the utility-production curves.

### *Examples of Labor Curves*

The manner in which curves of the intensities of labor may vary will be rendered clearer by considering two examples relating to men in very different circumstances, and doing different kinds of

work. For the first case we may choose a person having a very arduous occupation, as for instance a coal-miner. Owing to the bodily exertion required to hew coal, and the trying circumstances under which the man has to work, the pain curve falls much more rapidly than it did in the case of the man making bricks. The curve will probably start a little below the line  $OX$ , as at  $A$  (fig. 35), be

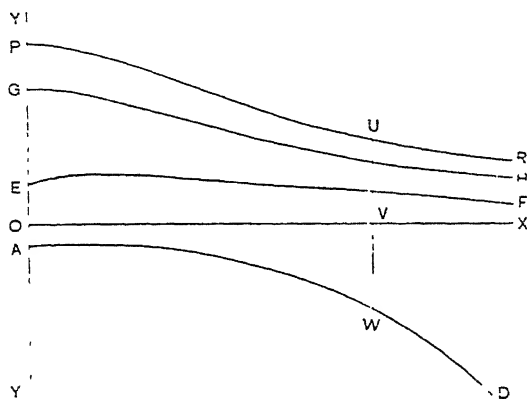


Fig. 35

horizontal for a little way, and then fall, at first gradually, and then more and more rapidly, to  $D$ , without anywhere rising to the positive side of the line  $OX$ ; for the work is too unpleasant to allow of its being a source of pleasure in itself at any time. The curve for his rate of production of coal—the rate at which he hews it, and clears it to the truck—will probably rise a little at first in the usual

way, and then fall steadily as the man becomes tired.

In tracing the curve of utility-production, we may assume the man to be poor, rather than rich, so that his F.D.U. for money and other commodities is high. We may take it, also, that he is working for hire, so that for him the product of his labor is not coal, but the money which he receives as wages. His stock of money being small, the amount of

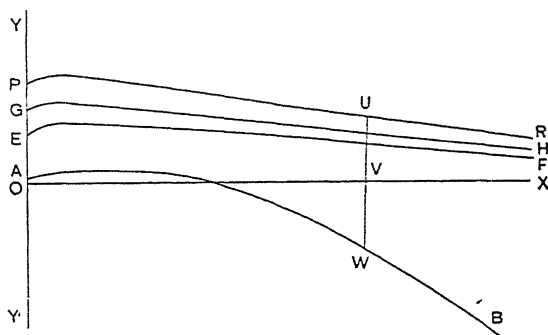


Fig. 36

money which he may earn by a day's work may well cause a decided fall in the F.D.U. of the stock, when added to it. His rate of utility-production curve will therefore fall considerably, as from G to H.

Turning, now, to another example, we may consider the case of some highly salaried official engaged in mental work—as, for instance, a bank manager. His curve of feeling AB (fig. 36) should

probably represent a slight degree of pleasure, even when he begins to work; then it may rise a little as his thoughts become fully directed to his work; and then fall gradually, passing to the negative side as his brain begins to tire. In reality, the smoothness of the curve should be broken by a few irregular rises and falls; for the work is not a monotonous performance of the same actions, but usually a series of different tasks, some requiring more mental exertion than others, or of a more tedious nature, so that they produce a greater intensity of pain. Indeed, the curve may oscillate many times between pleasure and pain. These irregularities are omitted altogether from the curve in the figure, for they would not alter its general shape, which alone is of importance in connection with the principles which we are here discussing.

The rate of production of commodity is often not easily estimated in the case of work which is chiefly mental. In the case of a man working for a salary, such as that we are considering, he may perhaps arrive at some estimate of his rate of production by imagining the whole of the work he is expected to do for his salary to be divided up into portions each of which would correspond to what, on the average of a long period, would take him, say, one hour to do. Then, if he did what he estimated was one hour's work in less than an hour, his rate of production would be high, and vice versa.

Proceeding on the assumption that this is a satisfactory method of measuring the rate of production of commodity, we are probably justified in shaping the curve for the bank manager whom we are considering somewhat as from E to F in the figure.

This worker's curve for rate of utility-production is not difficult to draw. Let us assume, if not that he is wealthy, at least he has saved enough to possess a comfortable amount of general property: his F.D.U. for money, then, must be low. Also, since his stock of money, or of things easily exchangeable for it, is large, the amount of money which one day's work adds to the stock is relatively small, and, as the result of one day's work, his F.D.U. for money falls but little. The rate of utility-production, therefore, is very nearly proportional to the rate of production of commodity, only showing a slight falling off compared to it, throughout the day. The curve of the former follows that of the latter, but with a slightly more downward tendency. The striking difference in shape between this curve and the corresponding one of the coal-miner is at once apparent; and it should be borne in mind that the difference is due solely to the much greater wealth which we have assumed for the bank manager, and the consequent flatness of his utility curve for money in the neighbourhood of the F.D.U. of his stock.



*Amount of Labor*

Labor having both intensity and duration, there is no difficulty in forming the conception of amount of labor. Labor of a certain intensity continued for a certain length of time yields an amount of labor. This is measured by the product of the intensity of the labor multiplied into its duration, and can be graphically represented by an area in precisely the same way as an area represents an amount of pleasure, or of pain. Corresponding with the three different intensities of labor already dealt with, there may be recognised three different kinds of amount of labor. The first is an amount of pain, since pain is one of the intensities of labor. The second is an actual quantity of commodity, because a certain rate of production continued for a certain length of time always results in a definite quantity of produce. For instance, if a man making, say, a hundred bricks per hour continues at work for three hours, then the amount of work he has done is reckoned by simply multiplying the intensity by the time—a hundred bricks per hour by three hours—which gives three hundred bricks. The lot of three hundred bricks is a quantity of matter—or mass—pure and simple, involving in itself no notion of intensity or time. A quantity of matter can be measured by its weight, by its volume, or, when it is divided into equal parts, merely by counting, hence the convenience which attaches to

this measure of an amount of labor, and the frequency of its use. The third kind of amount of labor is in reality an amount of utility. Each portion of the laborer's produce has to him a certain degree of utility and the multiplication of a degree of utility into a quantity of commodity results in an amount of utility.

Utility is not, for most purposes, a convenient measure of amount of labor, because, as has been explained, the degree of utility of a man's produce diminishes whilst he is at work, sometimes rapidly. As a rule, persons who employ labor reckon amount of labor by the quantity of commodity produced: either they pay by the piece—a direct recognition of the measure—or else they pay by time, with the condition, tacit or expressed, that the man shall work at a fair rate, and so produce a reasonable amount per hour. If he fail to attain a certain minimum rate of work he is dismissed.

The worker, on the other hand, measures amount of labor, not so much by quantity of commodity produced, as by the economic pain involved in the labor, and by the amount of utility produced. If he thinks what a trouble his work has been, he is reckoning the amount of work he has done by the pain he has felt. But, if he thinks with satisfaction of having made, for instance, another twenty cigarettes, to return to our previous example, he is reckoning by amount of utility; for his satisfaction

would be greater if the twenty new cigarettes were to be added to a stock of but two or three than if they were added to a stock of fifty. The laborer working for hire often measures amount of labor in the same way, though quite unconsciously. When he has only a few pence in the house, he feels that he has done a splendid day's work if he has earned five shillings; but when he has four or five pounds in hand, he does not feel nearly the same degree of pleasure at having earned the sum of five shillings. He thinks that he has done a great deal of work in the former case, and perhaps regrets that he has done rather a poor and unproductive day's work in the latter case; though he may have produced the same quantity of commodity, have undergone the same amount of physical exertion, and have suffered the same amount of pain, in both instances.

### *Definition of Work*

The cumbrous phrase *quantity of commodity produced* has been used up to this point, in preference to a single word, from a desire to avoid all possibility of confusion between the different methods of measuring labor. It will be convenient in the sequel to replace it by the word *work* in its substantive sense; so that *amount of work* will have the same meaning as *amount of labor in terms of quantity of*

*commodity produced*, and *rate of work* will stand for *intensity of labor in terms of rate of production of commodity*

The term *work* is superior to the phrase *quantity of commodity produced*, not only on account of its brevity, but also because its meaning is more extensive. Work is not always of the nature of actual making of commodities. it may consist merely of moving commodities from place to place, or of making such an insignificant portion of the object planned—as for instance, bolting a plate on a ship's hull—that the labor of such a period of time as we may wish to consider does not produce a commodity; or again it may be devoted to the destruction of things—as pulling down houses; or to the removal of discommodities. The conception of work adopted in dynamics by the physicist and the engineer—the product of a force into the distance through which it acts—is indeed closely akin to that which is here suggested for use in economics. The engineer takes, as his unit of work, the work done by moving a weight of one pound vertically through a distance of one foot. Such a unit might well serve to measure some kinds of work in the economic sense, as, for instance, that which is done by a man carrying bricks in a hod to the top of a scaffolding, or raising them by means of a pulley or winch. The difficulty with which we should be confronted, however, in trying to measure economic work in actual

units would be that a great number of different units would probably be necessary, for the forms of human exertion are so varied that nervous exhaustion must be taken into account as well as the expenditure of muscular energy. Nevertheless the economic conception of work is essentially the same as the physical; it differs, whether the work be making bricks, hewing quarrying stone, book-keeping, planning an enterprise or anything else whatever, an ultimate analysis of the actions which take place shows that all of them even including with great probability, the activities of the nerve cells, are the result of a force of a certain intensity producing motion through a certain distance.

### *Intensity of Anticipal Pleasure Attending Labour*

The nature of the ultimate reaction of feeling which induces a man to continue working after the exertion has become a painful effort now demands our attention. A man at work generally has his attention absorbed by the thoughts and actions which it involves more or less according to the nature of the work. Yet in every kind of employment a worker may probably find occasional moments of slackness when his thoughts may stray for an instant to other subjects if sometimes with only half his conscious-

ness. When such opportunities occur shortly after he has commenced work—more precisely, when they occur within the space of time during which his curve of present feeling is on the positive side of the axis OX—his thoughts may be directed to any matter whatever which interests him. On the other hand, if moments of slackness occur during such time as he is feeling pain as a result of continuing to work, his thoughts are generally arrested by the pain he is feeling, and he more or less consciously asks himself whether he need continue working. At such moments as these he becomes conscious of the utility of the commodity he is making, and a balance takes place in his mind between the anticipal pleasure which the contemplation of such utility causes him, and the pain which results from the labor. It is the purpose of this section to find out what is the determining cause of the intensity of the anticipal pleasure felt at such moments.

The discussion will be simplified if attention be at first directed to the relation between intensity of pleasure and utility gained, during a small portion of time for which the man is at work—during a period, say, of five minutes. The quantity of commodity produced by a man in five minutes has a certain amount of prospective utility for him; and his realisation that he has added this amount of utility to his stock in five minutes causes him a certain

intensity of anticipal pleasure lasting throughout the five minutes at such moments as he thinks of it, the intensity of the pleasure felt being proportional to the amount of utility added. But the amount of utility created in a certain time is proportional to the man's rate of production of utility; hence the intensity of anticipal pleasure experienced by the man during a short period of time, such as five minutes, is directly proportional to his rate of production of utility.

There is no reason for making the period of time considered so long as five minutes; the relation is equally true if the time considered be a minute, or a second, or the thousandth part of a second. Also, we have selected for consideration no particular short period of time: hence the relation is applicable to all short periods of time throughout the whole time during which the man is at work. The conclusion may, therefore, be drawn that whenever a man is at work, and directs his thoughts for an instant to the object of his work, the intensity of anticipal pleasure which he derives from the utility of the commodity he is making is proportional to his rate of production of utility. This principle may be named, for the sake of convenience, the *law of laborial pleasure*, the word 'laborial' being coined, according to the usual rule, to signify 'of, or pertaining to, labor.'

The law of laborial pleasure is a relation of extreme importance; and, as we have established it entirely by deductive reasoning, it may be well

to quote a few facts which help to verify it. The experience whilst at work of a feeling of satisfaction that one is doing good work must be familiar to almost everybody. This feeling consists for the most part of the anticipal pleasure whose intensity we have been studying; and we have, therefore, to find facts which will support the view that the 'intensity of this feeling of satisfaction depends upon the rate of production of utility at the moment at which it is experienced. We must be careful at the outset, however, to distinguish satisfaction with the work one is actually doing from satisfaction with the work that has been done. The latter is the anticipal pleasure caused by the total utility of the whole stock produced.

The ideal method of obtaining the facts required for verification would be the direct analysis of the thoughts and feelings of men engaged in various occupations. It is impossible, however, for the mental processes of others to be revealed to the observer, except in two ways: either by their own descriptions of their feelings or thoughts, or by inference of the causes of their visible bodily actions. Unfortunately, descriptions of their feelings coming from persons who have made no study of the subject under investigation are often unconsciously at fault, so that this method can have but a very limited application. There remains to the investigator, therefore, no choice but to make use of an analysis



of his own feelings under the proper circumstances; and to supplement this evidence by reasoning from his observations on other people's actions. For this reason and with no further apology, the author proceeds to quote some of his own experience in doing piece-work; though it is fair to say that he did not make any notes of his feelings at the time. Piece-work has been chosen in preference to any other method of remuneration, because it lends itself so easily to the measurement of rate of work and rate of production of utility, the latter being measured in ordinary life in terms of the utility of the money received in payment.

The work whose effect on the author's feelings is to be described was the marking of several hundred written answers to examination papers, paid at so much per answer; and it was done solely for the sake of earning money, the work being very tedious and not being in connection with any institution with which the author was otherwise interested. The author's general expenses being somewhat higher than usual at the time, the F.D.U. of money to him was by no means very low; so it may well be conceded that the degrees of utility of successive increments might diminish appreciably during the period of three weeks which the work occupied, if, as was the case, little was spent during that time. The author's intensity of satisfaction with the work he was doing varied, he remembers, chiefly with his

rate of work. Thus, when able to correct at the rate of thirty answers to individual questions per hour, he felt much more pleased than when, owing to mental fatigue, he could mark but fifteen or eighteen per hour. The explanation of this is that the utility production rate varied very closely with the rate of work, as it must do with anyone not in absolute poverty. The crucial point, however, is this: the author recollects distinctly that, after the work had been in progress for some time, in other words, after he had earned the right to be paid several pounds, the intensity of satisfaction which he felt at working at any given rate, say 30 answers per hour, was appreciably less than it had been for the same rate at the beginning, when he had as yet earned little or nothing. Thus the intensity of satisfaction was less, because the utility of successive increments of the product, say pence or shillings, had decreased. This, then, is a fact which supports the conclusion which he had already reached, that the intensity of pleasure experienced, during the continuance of labor, from the acquisition of the produce is proportional to the rate of utility production.

Verification of the law of laborial pleasure by the second available method—the interpretation of the actions of other individuals—depends largely upon observations of the conditions under which men are constrained to cease working. It will be

convenient, therefore, to postpone a discussion of the facts which may be used for this verification, until we have entered in some detail upon a consideration of the reaction of feeling which induces a man at some particular moment to desist from work.

### *The Cessation of Labor*

A man, if he act in conformity with the principle of the maximisation of happiness, should stop working at the moment when the intensity of present pain which continuance of work produces has become equal to the intensity of anticipal pleasure resulting from his rate of utility production, and there can be little doubt that in ordinary life a man does desire to stop work at this moment, and actually does so if circumstances permit. The precise moment at which this balance of feeling occurs is easily found in any case for which the curves of the intensities of labor have been drawn. If an additional curve be drawn to represent the variation of the intensity of the anticipal pleasure, the moment of cessation is indicated by the point on the axis  $OX$  which is equidistant in a vertical direction from this new curve and from that representing pain. This rule may be illustrated easily by returning to the case of the man making bricks,\* for which the labor

\*See page 151

curves have been drawn already (fig. 33), and for which there only remains to be constructed the curve of anticipal pleasure.

The curve of anticipal pleasure is easily drawn, if it be remembered that, according to the law of laborial pleasure, the intensity of pleasure is always proportional to the rate of utility production. The point at which the curve is to be started is fixed by the position of the pain curve, which is already drawn. This is because the units of pleasure and of pain are conveniently supposed to be equal to one another—that is, they are assumed to consist of quantities of feeling which exactly neutralise one another. Hence, intensities of pleasure and pain must be represented on the diagram by the same scale. The height at which the curve is drawn relatively to the curve of utility production is a matter of indifference, because there is no fixed relation at present determined between the units of utility and of feeling. In the figure, therefore, the curve has been made to start at P, on the assumption that the initial intensity of pleasure is five times the initial intensity of pain. From the point P the curve is continued through Q to R, by drawing it in its proper relation to the curve of utility production—that is, by keeping the relative heights of the two curves above OX the same throughout. If this has been done, the proportion of the height of the pleasure curve to the height of the utility-production

curve, above every point on  $OX$ , will be the same as required by the law of labor and pleasure.

From a study of the curves of pleasure and pain in fig. 33, it is evident that as the former curve falls, the intensity of pleasure is decreasing, and that, as the latter curve falls, the intensity of pain is increasing. A time must, therefore, be reached when the two intensities are equal and this moment is shown in the figure by the position of the line  $UVW$ , which is perpendicular to  $OX$ , and cuts the two curves, so that  $UV$ , representing intensity of pleasure, and  $VW$ , which represents intensity of pain, are equal. The position of the point  $V$  on  $OX$  indicates therefore, the moment at which the man will cease work.

### *Periods of Labor*

The increasing pain which attends continuous labor, and brings it ultimately to an end, is responsible for the custom of dividing labor into periods of a few hours' duration, separated by intervals for rest and recovery of strength. It might be in many ways convenient if a man could work for forty-eight hours in succession, and then have two or three days free in which to refresh himself with sleep and recreation; but nature has ordained that he shall do otherwise. The pain curve falls so rapidly, and the body becomes so much exhausted

by continual exertion, that it is rarely possible for any man in any kind of work to extend his normal period of labor beyond twelve hours, without serious injury to his health, even if he have adequate intervals of rest.

Some kinds of work are more arduous than others, and cause the intensity of pain to increase more rapidly. The result is that in all kinds of work of an exacting nature, the normal period of labor is short relatively to that which obtains for work which is light. This principle may be well illustrated by considering a few special cases; and we cannot do better than take first the examples for which we have already drawn the labor curves. In the case of the coal-miner, which was described on page 157, and illustrated in fig. 35, his pain curve falls rapidly, owing to the disagreeable nature of the work; and his rate of utility-production curve GH, which his poverty renders high at the beginning, falls fast, as his wants are comparatively few. His anticipal pleasure curve, shown by PR, which has been traced in the same relation to the utility-production curve as was assumed in the case of the man making bricks (fig. 33), therefore also falls fast; and the moment of compensation, at which he stops work, shown on the diagram by the line UVW, comes quickly. As the curves of both figures are drawn on the same scale as regards time, it is obvious, on comparing

them, that the coal-miner will work a much shorter day than the brick-maker.

In the case of the highly salaried bank manager, the chief point of interest lies in the fact that the utility-production curve—and hence also the curve of anticipal pleasure—falls but slightly during a normal period of labor. The length of his day's work is determined, therefore, almost solely by the shape of his pain curve, which, owing to the exacting nature of head work, will fall almost as rapidly as that of the miner. As his anticipal pleasure curve is low throughout, because money has for him a low *U.D.U.*, the balance of feeling will occur for him even sooner than it did for the miner, and he will work a somewhat shorter day.

For another example of a different kind we may take the case of a railway signal-man, who, we may suppose, is not working on a busy line. His labor curves are represented in fig. 37 and it is to be

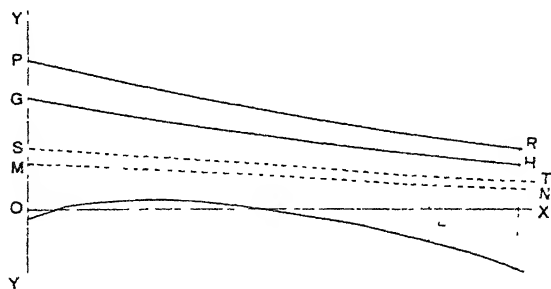


Fig. 37

noted with regard to them, that his pain curve falls but slowly, as the work, in that it makes only intermittent demands upon his whole attention, is not severe; and that his rate of utility-production curve is somewhat high, as he is not supposed to be in affluent circumstances. It is therefore a long time before his pain curve falls as far below the axis OX as his anticipal pleasure curve PR stands above it: and he is thus able, without undue fatigue, to do a long day's work. In the figure the rate of work curve has been omitted; for, if the trains run at fairly regular intervals, the rate of work may be regarded as invariable, and the 'curve' would be a horizontal straight line.

The effect of the severity of work in shortening the period of labor is easily comprehended; but the similar effect of a low rate of production of utility is not so evident, and may be worth emphasising a little. Returning again to the example of the man making bricks, and to the diagram of his curves (fig. 33), we may notice that, if his utility-production curve were as high as MN, and his anticipal pleasure curve were, therefore, shown by the light broken line ST, he would continue working until the time shown by the line TL; and his period of work would be the time represented by OL. But if his stock of bricks, or of money, is great enough



to lower his rate of production of utility to such as is shown by the curve GH, his period of work is shortened to OV. As another example of this effect, we may suppose that the signal-man whose curves we have already discussed has, by legacy or otherwise, received a sudden accession of wealth. The FDU of money to him will therefore have been lowered, and with it his rate of utility-production curve will also have been lowered, as to MN (fig. 37), and also his curve of anticipal pleasure, ST. He will now desire to cease work at a much earlier hour namely, at the time shown by L on the figure, when compensation takes place. As the rules of the railway service probably would not allow of his working a shorter day at signalling, he would probably either seek lighter work or work at which he could choose his own hours of labor, or, more probably, he would try to find work which, though combining harder work with shorter hours, was so much better paid that the increased rate of utility production arising from the increased pay would counterbalance the extra pain. If he were unable to find other work which suited him, he would probably remain in the railway service, and agitate for shorter hours and higher wages.

The inference may, therefore, be drawn from the curves that, the richer a man is, the shorter will be his day's labor in any particular kind of work.

The effect of the introduction of machinery upon the hours of labor is a matter of considerable interest. From the curves it is easily seen that, since machinery increases the rate of work, the rate of utility-production curve will be raised, and the period of labor must be lengthened. This effect is accentuated by the fact that tending machinery is usually a less fatiguing kind of occupation than making the same commodity with hand tools, so that the pain curve falls less quickly. If we consider any example of a man working on his own account, who buys a machine to aid him, we shall see that these deductions are probably correct. Let us suppose that a carpenter, working at making common furniture, perhaps with two or three assistants, sets up sawing, planing and moulding machinery driven by a small gas engine, after having calculated that there would be plenty of demand for all the extra furniture he could make. With the same staff he can now earn so much more per hour that he feels quite ready to work an extra hour or two per day himself; and he is quite ready to pay his men a little extra per hour, *i.e.*, to increase their rate of utility production—in order to induce them to continue working a longer day.

The introduction of machinery in factories, the owners of which do not themselves take part in manual labor, is quite a different matter, since here

it is the general rule that an extra rate of work means only a comparatively slight increase of rate of utility production. As will be fully explained in the essay on Production, an increase of produce tends to lower its selling price: consequently the employer, after introducing machinery, will only be able to offer his workmen a slight rise in wages. This slight rise of wages, which British workmen have certainly had, ought theoretically to have been sufficient to induce them to work a slightly longer day. It would have been so, probably, had there not been other influences at work which more than counterbalanced it.

### *Practice in Regard to Hours of Labor*

It will be found that the majority of the foregoing theoretical conclusions are fully borne out in practice; and of those that are not, the disturbing cause is never hard to find. A man who drives a cab or omnibus, for instance, can labor for many hours a day, and sometimes does actually work (including waiting) for twelve or fourteen hours. Most railway men in England work very much longer hours than men in some other vocations: some of them, such as signalmen, frequently work for twelve hours a day. These are light kinds of work where the pain curve falls very slowly because the work is more or less congenial, or at least not arduous.

For people doing exhausting work—like divers, coal-miners, or persons who have to carry heavy weights—and for all those whose work entails much mental effort, the pain curve naturally falls more rapidly: thus they are obliged to work much shorter average hours.

Any fixed length of working day to apply throughout a trade is a striking anomaly, if the matter be considered solely from a theoretical point of view. As has been stated already, the labor curves differ in shape for each individual—even for men doing the same work; and it is impossible, therefore, that the balance of feeling should occur for everybody at the same moment. Taking account of the very considerable differences to be found in men of the same race, as regards physical constitution and temperament, it may be said safely that there is probably a difference of as much as two or three hours between the lengths of the theoretical daily periods of labor of many normal persons doing the same work. An arrangement which would permit each workman in a factory, or other employment, to labor each day just as long as he pleased, were it possible, would undoubtedly be in many respects a great boon to the men. It would prevent physical injury to the weak from overwork, and would allow the strong to use the whole of their power for the good of themselves, and indirectly, of the community. This ideal was to some extent realised in the middle

ages, when well nigh every crafts-man was his own master: but at the present day its application to any industry would be hopelessly impossible. There are many things, the production of which is possible only by the combination of the labor of a number of men working together, and it would be impossible for the work to proceed if the tired members of a gang were to stop. In many cases, also, the running of machinery is necessary for the work, and there would be waste in keeping it going for less than the whole staff of employees.

Under modern conditions, the only possible arrangement of the working hours in any trade is to make them approach as nearly as possible to the average of the theoretical working days of all the men engaged in the trade. For instance, in a factory, if the number of hours which elapse before the balance of feeling occurs for each of the workmen—taking the average number of days—be as follows:— $7\frac{3}{4}$ ,  $8\frac{1}{4}$ , 10,  $8\frac{1}{2}$ ,  $7\frac{1}{2}$ ,  $10\frac{1}{4}$ , 9,  $8\frac{3}{4}$ ,  $9\frac{1}{2}$ , 8,  $8\frac{1}{4}$ ,  $9\frac{1}{4}$ ,  $7\frac{3}{4}$ ,  $8\frac{1}{2}$ , the average theoretical working day of the employees (the mean of these figures) is 8.66; and it is evident that in this particular factory the most convenient length of working day would be  $8\frac{1}{2}$  hours. In this manner the length of day most agreeable to the workers in any particular trade could be fixed. It would only be necessary to take a vote from each man as to how long he usually felt inclined to work—always supposing the rate of pay per hour to be

unaltered by the length of day—and to calculate the average.

In trades which require the investment of much capital in factory plant there is a very natural reluctance on the part of employers to concede reductions of hours, because, the shorter the working day, the less is the daily return on the capital invested, and the smaller is the margin remaining after interest and other expenses have been paid. This difficulty will probably be met in the future—and with great advantage to the employer—by working a double shift each day. For instance, the first shift might work from 5 to 9 a.m., and from 10 a.m. to 2 p.m.; the second from 2 to 6 p.m. and from 7 to 11 p.m. Saturday would be a half-day, the first shift working, say, from 7 to 11 a.m., and the second from 11 a.m. to 3 p.m. There would thus be required but half as much plant and factory space for the same total output as when the work was done by one shift. There would certainly be some inconvenience to the workers in having to keep abnormal hours, but it is no more than is endured by railway, colliery, newspaper, and many other employees at the present time. The employers, indeed, could well afford to pay a slight increase of wages by way of compensation for the inconvenience, and yet profit by the change. In the larger manufacturing centres, after a short time, entertainments and other means

of recreation would probably be placed within the reach of both shifts at times convenient to them.

### *The Eight Hours' Day Movement*

A reduction of the hours of labor to a minimum consistent with the prosperity of industry is an object which every right-thinking man will applaud. It is not necessary or desirable in our present state of civilization that a man's whole time be devoted to earning money; for the earnings of but a part of the day are amply sufficient to provide the necessities of life, with something left to spend on luxuries. A man should have some time free for recreation, and for self-improvement, if so minded.

Considerations such as the foregoing have inspired much agitation by workmen of nearly every trade for a reduction of the working day in all forms of employment to eight hours; and this reform campaign has become generally known as the Eight Hours' Day Movement. Previous pages will have made it clear, however, that a uniform working-day of eight hours—or, more correctly, working-week of forty-eight hours—to obtain throughout every kind of employment, is an ideal hardly in consonance with the theory of labor, even if there were an apparent possibility of its being realised in practice. Different occupations are so various in the extent

to which they fatigue body and mind, that eight hours would be much too long a day for some of them, and unnecessarily short for others. For each trade or kind of work a standard working day might with advantage be recognised, shorter than eight hours in trades in which the work is trying, longer in those in which it is light; but the community would not be making for the maximum of happiness if, by compelling all to work an equal day, it wasted the precious energy of some of its members, and caused others pain by overworking them.

In a great group of industries, including the building and printing trades, the textile and wood-working industries, and the majority of metal workers, a business week of about forty-eight hours would doubtless be possible, though it would be unreasonable of employees to expect at once the same wage for eight hours as they now obtain for nine. Certainly, some employers have found that a reduction of hours, particularly the abolition of work before breakfast, has so stimulated the men's rate of work that they have still been able to pay the same daily wage as formerly; but it would be rash to suppose that this would be possible in every case. Where work is conducted in factories, and the double-shift system could be adopted, it would doubtless be possible to reduce the hours of labor to forty-four per week, as was assumed in the example



of possible hours for working a double shift already quoted

For many kinds of employment, on the other hand, an eight hours' day would not be suitable. Miners working at great depths, many employees in chemical works, others working with noxious materials, and the great army of brain workers, find a day of seven hours ample; whilst those whose work entails periods of waiting, such as porters, elevator-men, cab-drivers, signal-men, guards of goods trains, some shop assistants (when provided with seats), men in charge of small engines, and a host of others, including the majority of workers in pastoral and agricultural pursuits, can easily work ten hours a day—or sixty hours per week—without becoming unduly tired. In every employment the hours of labor must be fixed in accordance with the nature of the work.

Reduction of the hours of labor is not only one of the most rational proposals for industrial reform, but is also one in which agitation has the greatest promise of success, if the hours are really longer than those for which the workmen care to labor at the existing wage per hour. A retrospect throughout the eighteenth and nineteenth centuries shows that a very remarkable reduction of the working hours of laborers, artisans, and factory hands, has already taken place. Twelve, or even fourteen, hours a day were often worked in factories

in England a century ago, and ten hours was the universal rule in most English trades until but a few years ago. Other countries are now in the condition which was England's fifty or a hundred years ago; ten hours is the usual time in France and Germany, something over ten in Austria and Russia, and twelve hours in Japan.

The reduction of hours which has taken place in England, America, and Australia, is the result neither of legislation nor of the generosity of employers. It has been obtained solely by the agitation of the working classes and the efforts of trades-unions. From these facts we may conclude that whenever a body of employees are almost unanimous in desiring a shortening of their working day, and are willing, with that object, to forego the same proportion of their day's pay, they will have little difficulty in obtaining the reduction, if organised. It is, indeed, solely the intensity of the desire for shorter hours on the part of the workers which determines whether they obtain them or not. It may be of interest, then, to inquire on what the intensity of this desire depends.

Bearing in mind the theoretical conclusions reached in previous sections, it is easily understood that, as the wages of the general class of manual workers are raised, the latter become richer in possessions, and are able to live in greater comfort. The F.D.U. of money to them diminishes, therefore,

as wages rise; and, consequently, their rate of utility production is lowered. To such an extent, indeed, is the F.D.U. of money reduced that its reduction quite overbalances the tendency of the increased rate of production of money to raise the rate of utility-production. A lowering of the curve of anticipal pleasure throughout each period of labor naturally accompanies the lowering of the curve of utility-production, and the balance of feeling is thus reached sooner than it was in previous years when wages were lower.

If we review the changes which have taken place in England during the nineteenth century in wages and in hours of labor and make an analysis of cause and effect, we may state the factors which have operated for and against bringing about the reduction of working hours somewhat as follows:—(1) During the nineteenth century, artisans' money-wages rose over 150 per cent., say from about 13s per week in 1800 to 35s per week in 1900. The rise of real wages—the real wage eliminates change in the purchasing power of money, and so enables us to form a truer estimate of the utility of the earnings of labor—was not so great, but was nearly 150 per cent. The rise of wages was due chiefly to the increased rate of work which is attained by the aid of machinery. Through a complicated chain of causation, which will be dealt with in the essay on Production, an increase of wages

is always forced on employers not many years after an old method of production has been displaced by one which is more efficient. Increased wages mean, as has been stated, a lower F.D.U. of money, and a shorter day's work. (2) Another cause tending to diminish the working day is the extreme monotony of work in many factories where division of labor is rigorously practised, the monotony tending to make the pain curve fall faster.

Causes tending in the opposite direction, that is, to lengthen the working day, are: (1) the rise of wages—which means an increased rate of production of money, and would mean an increased rate of utility-production if the workman had not got richer; (2) an increase, through improvement of general education, of the power of anticipation amongst the working classes—which tends to increase the utility of the product of labor, and which, therefore, operates to lessen the reduction of this utility, arising from increased wealth; (3) the substitution of machinery for hand labor—which has greatly lightened the bodily exertion necessary in some kinds of work, and has thus led to the pain curve falling more slowly. With regard to this cause, however, it should be said that a man, with practice, seems to become able to endure severe bodily exertion for long hours without painful fatigue; and also that in many cases a lightening of muscular exertion by machinery has meant an increased demand

for nervous exertion. (4) Another, and an important, factor tending to lengthen the working day is the development of new tastes, and the stimulus of existing ones, which accompanies the general improvement in the welfare and education of the industrial classes. A keener sensibility to pain, and stronger desire to experience pleasure, increase the degree of utility of money, and would have the effect of lengthening the hours of labor, if the working classes did not at the same time constantly grow richer by saving utility.

The causes tending to shorten the day's work—and more especially that of increased wealth consequent on the rise of wages—have evidently preponderated in their effect over the causes tending to lengthen it, since the last century has seen so marked a reduction of hours. Yet the latter causes have not by any means been inoperative; for, if they had, the reduction of hours would unquestionably have been very much greater than it has been. Evidence in favor of this view is to be found in the effect of introducing industrial methods among some non-European races. The present labor difficulty in South Africa arises, no doubt, very largely from the fact that some of the causes which induce a man to continue at work are wanting in the case of the Kaffir: he has very little power of anticipation, for instance, and what is, perhaps, more important, the increase of wealth

which European work has provided for him has not been accompanied by any corresponding development of new wants. Some new tastes certainly he has developed, but most of them, like that for drink, are pernicious, and the means of satisfying them must be withheld from him as far as possible. There are accordingly many persons who suggest that the Kaffir should be trained in European ways of life, with a view to developing wants for the satisfaction of which he will have to work. This, however, is a policy which will need many years for its consummation; and, in the meantime, such expedients as the importation of foreign labor, or forcing the natives to work by means of heavy taxation, are politically bad.

The author does not remember having seen it suggested that a very short working day for natives should be tried, say four hours a day on five days a week. If it were arranged that during his idle time the man might live as much as possible according to his pleasure, deprived only of drink and narcotics, it might be found that he would work continuously for many years, instead of returning to his tribal life immediately on the expiration of his contract, as at present. The rate of pay per hour might remain the same as at present, for the difficulty appears to be that now the man gets rich too quickly even on the pittance he receives, and so

the F.D.U.\* of his money soon falls too low to induce him to work at all.

### *Most Economical Rate of Work*

When a man's work is of such a nature that he may please himself as to the rate at which he works, he will find that for himself there is a particular rate of work which will enable him to produce a maximum of the product within a single period of labor, that is, before his balance of feeling occurs. In general, this most economical rate of work is different for each person; and it must be so, because the shapes of the labor curves are different for each individual. A very fast rate of work tires more quickly than in proportion to the increased rate of production, and a very slow rate of work allows a man to become tired in too great a degree by the progress of the ordinary and continuous vital functions, such as the mere fact of seeing and hearing, and of breathing and blood-circulation, as well as by the special exertion of the labor. Hence, when working very fast, a man's pain curve falls so quickly that the balance of feeling is reached before so much of the commodity has been produced as might have been if the rate of work had been slower. On the other hand, if a person work very slowly, though it may be a long time before his

balance of feeling occurs, yet it will come before he has accomplished as much as he would have done at a somewhat faster rate of work. It is readily perceived, therefore, that for each person there is some intermediate rate of work at which he can produce a maximum of work during the period which elapses before his balance of feeling is reached. This rate may be determined by each man for himself by actual experiment, and he will probably find advantage in knowing it. His theoretical working day will then become that period which corresponds to his most economical rate of work.

### *Overtime Work*

The rates of pay for overtime work may be illustrated by the following examples. In 1897 the painters of Leeds were paid 'time and a quarter' from 5.30 to 8 p.m., 'time and a half' from 8 till midnight, and a double rate after midnight. 'Time and a quarter' simply means that the hour is reckoned as  $1\frac{1}{4}$  hours paid at the normal wage; hence this rate for overtime work is 25 per cent. above that which prevails during normal hours. Again, in the same year, the plumbers of Manchester received  $1\frac{1}{4}$  from the close of the day's work till 7 p.m.,  $1\frac{1}{2}$  from 7 to 10, and double rate after 10 p.m.; whilst the compositors of Leeds, who obtained 8d.



per hour as their normal wage for day work, were paid 2d. extra per hour from 7 to 9 p.m. 3d. extra from 9 till midnight, 4d. extra from midnight to 2.30 a.m., and 5d. extra from 2.30 a.m. till the time of starting day work, presumably 7 a.m.\* The practice with regard to hours and rates of pay for overtime work is very various in different trades and localities, but the cases cited may be taken as being fair illustrations of the custom prevailing in England.

In the common practice of overtime payments there appears generally to be a confusion of two distinct principles, which it is advisable to treat separately in a theoretical discussion of the subject. In the first instance, a man, after working his normal hours in the day time, perhaps from 7 to 8.30 a.m., from 9 to 1, and from 2 to 5.30, may be required to continue at work owing to pressure of business; and then, to compensate him for extra effort, and to induce him to continue, he is paid an increased hourly wage, according to some such scale as those mentioned. On the other hand, in many employments, such as on railways and in ironworks, the work must be kept going night and day, and it is necessary always to have a night shift. In this case it is not uncommon for the night shift to be paid a wage of 25 per cent. higher than the rate paid to the day shift doing the same kind of work.

\* F. W. Lawrence; *Local Variations in Wages*, London, 1899.

It will be convenient here to confine the application of the term *overtime* to work of the former kind only, namely, that which a man does after he has finished his normal day's work. When the whole of a man's daily period of labor is confined to the night hours, as in the latter case, his work will be designated *night-work*. The essential difference of overtime and night-work is apparent when it is remembered that in the former case a man starts his overtime work already tired by a full day's labor, but that in the latter case he starts refreshed from sleep obtained in the day-time.

*Night-work* is remunerated on a higher scale than day-work to some extent, perhaps, because work by artificial light is more trying than work by daylight, but chiefly because of the general unpleasantness of a life in which a man sees but little sunlight, and is largely cut off from social intercourse and ordinary means of recreation. If the work by artificial light be more trying, the pain curve falls faster; and a higher rate of utility-production is necessary to keep the man at work. This may account for part of the extra wage which has to be paid for night-work. The remainder of the extra pay must not be regarded as the actual earning of labor, for it is not the nature of the work itself which necessitates it: it is rather to be looked upon as compensation paid to the workman in order to induce him to work at a particular

time, and on that account to forego many of the pleasures of ordinary life.

The nature of *overtime work* is evident from a study of the labor curves. At the end of his usual day's work a man's pain curve has fallen so far as to quite, or very nearly, balance the intensity of his anticipa<sup>l</sup> pleasure derived from contemplation of the utility he is producing. He can, therefore, only be induced to continue his labor by an increase of his rate of utility-production, which is secured by the extra pay. As he continues at work, however, the pain curve still falls; and very soon—in two or three hours—the increased rate of pay fails to supply sufficient anticipa<sup>l</sup> pleasure to keep him at work, and a second increase is necessary. If he be required to continue much longer at work his rate of utility-production must yet again be raised. A diagram illustrating the state of the man's feelings would show the pain curve continuously falling more and more steeply, and the curves of rate of utility-production and anticipa<sup>l</sup> pleasure mounting by sudden steps.

A promise was given, at the conclusion of the section dealing with the law of laborial pleasure, that a statement would be made at a succeeding point in this essay, of facts which tend to verify that law, and which are obtained by a study of other men's feelings. It appears to the author that such facts are, or might be, supplied by the practice of

extra payment for overtime work. The painfulness of labor constantly increases as a man continues at work; and the anticipal pleasure which he derives from the work he is doing must be increased to an equal extent at least, or he would cease work. Now, the cause of his anticipal pleasure cannot be his rate of work—the rate at which he is producing the commodity—because that, as he grows more tired, is constantly decreasing. The only factor which is increasing is the rate at which money is paid him; or, as money has acquired utility, the rate at which he is earning utility is the only increasing factor. This leads to the conclusion that the increase of intensity of anticipal pleasure must depend upon the alteration of rate of utility-production; and, in the absence of evidence to the contrary, we may assume that the two quantities do vary proportionately.

Absolute proof of this proportional variation, apart from deductive reasoning, would be possible only by collecting special data with regard to payment for overtime. If the variation be proportional, and if the pain curve really fall more and more steeply, as we have hitherto assumed, successive periods which elapse before another equal increase in the rate of pay becomes necessary should become shorter and shorter. Thus, if 25 per cent. increase sufficed to keep the man working an extra three hours, an increase to 50 per cent. should only suffice

for an additional two hours, or thereabouts, and an increase to 75 per cent. for a further period of but one hour. The available statistics do not tend to support this supposition; but this is probably due to the fact that they do not discriminate between the rates for overtime and for night-work. It is probably very rarely the case that a man who has worked all day continues working at all after 10 p.m., so that the end (10, 11, or 12 p.m.) of what is usually taken as the second period is rarely reached.

## V

# EXCHANGE AND CAPITAL

## SYNOPSIS OF LECTURES

### *Theory of Exchange*

EXCHANGE is the act in which two people engage when each one voluntarily, and at the same time, transfers to the other a portion of commodity, the two portions being unlike in kind. A *simple ratio of exchange* (R.E.) may be defined as the ratio of the quantities of the commodities exchanged, each being measured in the same unit. When the quantities exchanged are measured in different units (*e.g.* pints and pounds) the R.E. may be called *mixed*

The motive for exchange is gain of prospective utility. If for one person the F.D.U. of commodity P is greater than the F.D.U. of commodity Q, and for another person the reverse is true, they will

both gain by effecting an exchange. In general, any R.E. between certain limits will produce a gain of utility on both sides. Experience of common life supports this conclusion. These limits can be fixed mathematically by considering the utility curves of each commodity for both persons, and the stocks of the commodities they possess, and assuming a given amount of one of the commodities to be offered by one person. Exchange will cease when one (or both) parties would gain no further utility by continuing. The R.E. at which exchange ceases is definitely fixed, the limits of variation of the R.E. becoming more and more confined as cessation is approached.

When the stocks and original offer are of such size that the R.E. is not definitely fixed, but only set within certain limits, the factors which determine it exactly are skill in bargaining, competition, and others. Such causes cannot affect the limits, because no man will exchange at a loss of utility (except for the purpose of attracting customers).

Changes of the R.E. at which two persons exchange two commodities are caused in various ways. If A and B be persons, P and Q commodities, and if A gives B a portion of P in exchange for a portion of Q; then the ratio P:Q is increased (*i.e.* the quantity of P given is increased and the quantity of Q received is decreased) by the following causes —

- (1) Increase of A's stock of P;
- (2) Increase of B's stock of P;

- (3) Decrease of A's stock of Q;
- (4) Decrease of B's stock of Q;
- (5) Fall of A's curve for P;
- (6) Fall of B's curve for P;
- (7) Rise of A's curve for Q;
- (8) Rise of B's curve for Q;
- (9) Decrease in A's skill in bargaining;
- (10) Increase in B's skill in bargaining;
- (11) Increase in number of persons (competitors) with stocks equal to those of A wishing to possess Q;
- (12) Decrease in number of persons with stocks equal to those of B wishing to possess P.

Money is a medium of exchange; and also functions as a measure of R.E. Price is the mixed R.E. of money units and a unit of commodity; *e.g.*, if the R.E. be:—

Money · tobacco = 7 shillings : 1 lb.,

then the price is said to be 7s. per lb. The variations of prices from different causes can now be ascertained by substituting 'money' for 'P' in the above list. Thus the quantity of money given will increase, and the quantity of commodity received will decrease, *i.e.*, the price which A will be willing to pay will rise when:—

- (1) A's stock of money increases;
  - (2) When B's stock of money increases, etc.
- (See section on Fluctuation of Prices below.)



A *market* may be defined as any group of persons associated in one place, or by rapid means of communication, with the object of exchanging two commodities, each person being constantly aware of the rates of exchange offered by the other persons, and immediately informed of the R.E. at which every individual exchange is effected. A buyer in such a market constantly raises his offers, until he finds that any further rise would mean little or no gain of utility to him. A seller starts endeavoring to sell at a high reserve price, and, if his offer be not accepted, constantly lowers and lowers his price, until a lower offer would mean no gain of utility. If there be several sellers and buyers, their respective stocks and utility curves will differ; hence one seller will be able to offer lower than any other, and one buyer higher than any other. If the offers of these two coincide, an exchange will take place. Frequently such extreme offers overlap, and in such cases skilful bargaining decides the R.E. within the fixed limits. Other buyers and sellers then find that they may gain in utility by exchanging some smaller parts of their stocks at the same rate, and thus a market price is established. Obviously it is only the two or three buyers and sellers whose stocks are such that they can exchange large quantities at a given rate, who fix that R.E. Others cannot influence it, and must wait until the stocks of others so alter that they can gain by exchanging.

*Law of Indifference:* In the same market, at the same time, there cannot be more than one R.E. for the same commodities.

At any given market-price exchange will soon cease unless there be external additions to sellers' stocks, corresponding with sales. A change of market-price will generally be caused by alterations of stocks due to external causes. *Law of Supply and Demand:* If supplies come to market at a less rate than the average rate of demand the market-price will rise; if at a greater rate it will fall. In the case of foods, since the rate of consumption is on the whole much steadier than the rate of production, it is generally variations in supply rather than in demand which affect the market-price. In the case of metals the reverse is true.

Commodities are distributed by exchange. The commodity is usually three times exchanged for money, successively by the producer to the wholesale merchant, by him to the retail merchant, and by the latter to the consumer. A *merchant* buys from one for whom the F.D.U. of the commodity is low, and sells to one for whom it is high. The utility of the commodity for the merchant is only acquired, depending on its salability. If trade be depressed *i.e.* if the volume of exchange be small, his utility curve falls, likewise the F.D.U., and the price he will buy and sell for. In selling by *fixed prices*, the shopkeeper estimates the average utility curves of

the public; and chooses a price lying within his own limits, and the average limits of the section of the public for whom he caters.

A market is said to be *rigged* by a merchant who buys up a large proportion of all available stocks of a commodity, thus raising the price at which others must buy. He is only likely to succeed if the world's supply of the commodity is short of the usual demand. If others have sold for future delivery they may be *cornered*, or compelled to buy at higher prices than they sell at.

### *Representative Money*

*Representative Money* is the name given to all money of which the acquired utility due to its exchangeability is greater than its direct utility. It may consist of any portable, usable commodity, *e.g.* metals (tokens), leather, or paper. At present metals are used for small amounts, paper for large sums.

Paper money is of two distinct kinds:—*convertible* and *inconvertible*. A convertible note is a promise to pay the bearer, either on demand or at some specified date, the sum on the note. Some security for payment has been found to be necessary, except for a limited number of Government notes. The number of partially secured notes issued privately (by banks) or by Government has to be strictly limited. The methods of regulating *convertible* paper

may be classified according to the security and check on number, as follows:—

- (1) Simple Deposit;
- (2) Partial Deposit (Bank of England notes);
- (3) Minimum and Proportional Reserves;
- (4) Maximum Issue;
- (5) Elastic Limit;
- (6) Documentary Reserve.

*Inconvertible* paper may form a perfect currency if issued by a trustworthy Government. If in circulation with gold, the issue must be contracted on the least sign of depreciation. Its value may also be kept up by receiving it at face value in payment of taxes. A currency consisting solely of inconvertible paper and tokens could be regulated perhaps on a population basis or by watching prices.

### *Substitutes for Money*

The use of an immense volume of currency is avoided, with great saving of labor, in loss of gold, and in interest:—

- (1) By the use of *credit documents*,
- (2) By *book credit*.

Banks act as agents in both cases. *Credit documents* consist mainly of Promissory Notes and Bills of Exchange, and are made payable after short or long terms. They are of immense importance as an international medium of exchange, *e g.* bills drawn

on London by a Sydney merchant for goods exported by him, and payable in London, will be sold in Sydney at a price depending on the demand for and supply of bills on London. Should the discount on bills exceed a certain percentage it may be more profitable to transmit gold. *Book Credit* is the most perfect medium of exchange. A cheque or banker's order effects a transfer of any amount on the bank's books, or through the Clearing House if the accounts be in different banks.

*Pecunity* consists of bullion, currency, and any commonly accepted evidence of a right to claim a portion of currency, *e.g.* credit in a bank's books, and credit documents. Currency includes gold and representative coins, together with convertible and inconvertible notes.

Fluctuations of Prices are caused: I. By changes of stocks, the bargain limits being thereby affected; II. By skill in bargaining and by competition, the limits remaining stationary, so that fluctuations are restricted within them. Causes of Class I. may be subdivided into:

I (A) The following is a list of the causes which will *raise the price* of a commodity (the numbering corresponds with that of the table above):—(3) Consumption beyond normal, *e.g.* fodder in time of drought, building and engineering materials in times of industrial prosperity; (4) Underproduction of

commodity, *e.g.* bad harvest, or combination amongst manufacturers to limit production; (7) Rise of consumer's curves for a commodity, *e.g.* when a new use has been found for it, as rubber for bicycle tyres, or platinum for electric lamps; (8) Rise of seller's curve for a commodity. This probably occurs when rise of price has been initiated by another cause; also when environment changes, either by seller moving his stock, or settlement increasing around him.

(B) (5) and (6) Curves for pecunity are probably practically stationary. (1) and (2) Prices of all commodities rise when either buyers' or sellers' stocks of pecunity increase.

A general increase of stocks of pecunity results from: (*a*) increase in stocks of gold, *e.g.* on goldfield, or world-wide, by general production exceeding consumption; (*b*) by increased issue of paper money not fully backed by gold or silver; (*c*) by increase of normal credit operations, *i.e.* credit based on commodity, *e.g.* upon good harvest or abundant wool-clip, (*d*) by increase of abnormal credit operations, *i.e.* credit with no basis of goods, *e.g.* in times of false prosperity preceding panic.

II. (9) and (10) can affect individual transactions only. (11) and (12) Competition amongst buyers slightly raises price; amongst sellers slightly lowers it.

*Hire*

The *use* of a usable commodity for a certain length of time may be bought and sold. A certain *amount of utility* is then exchanged for a portion of commodity. The utility gained by the hirer is usually proportional to the length of time for which he uses the article, so that he pays money proportional to the time for which he keeps it. Any portion of such money is called *hire*, and the amount of money paid per unit of time is called *rate of hire*. In the case of certain commodities, other terms equivalent to *hire* are commonly used; as *rent* of land and *interest* of money.

*Impediments to Exchange*

The impediments to exchange include cost of transport and packing, agents' or brokers' charges, dock and harbor dues, and customs duties. Economically, all such expenses may be regarded as taking the form of a surrender by each party of a portion of the commodity received, resulting in less gain of utility on both sides. Impediments are frequently so great as to prevent what would otherwise be an advantageous exchange. Transport should be rendered as cheap as possible by large and economically managed systems, by developing

inland waterways, by increase of trainloads, and by development of road motors. Cheaper and more rapid methods of handling merchandise at docks and railway depôts are very desirable.

Customs duties are invariably impediments to exchange. Furthermore, when levied on articles produced in the country, home manufacturers are enabled by combination to raise prices to the level of foreign prices plus impediments. They thus obtain a greater net produce than without duties, to be divided amongst the agents of production. One class of the community, the producers, is thus benefited at the expense of the rest, the consumers. The poorer classes will feel the increased cost of living more than the richer. If all the necessities of life are protected the cost of living is raised for the producers, whose real wages are therefore but little increased. Foreign trade must consist of an exchange of commodities, because money cannot flow continuously in one direction. Hence the balance of foreign trade must be preserved, so that keeping out foreign goods leads to less exportation.

### *Cost of Production and Price*

There is *no* direct connection between the *cost of production* and the *price* of a commodity. Once produced its price is regulated only by the law of



exchange. An indirect relation exists, however, between the cost of production and retail price of commodities *in general demand*. At each price there will be a certain demand depending on the consumers' utility curves. Thus there may be constructed a *demand curve*. The producer therefore produces just such a supply as will keep the price sufficiently above the minimum cost of production to provide him with a livelihood. The balance may be disturbed by over-production through competition, by under-production due to combination amongst enterprisers, by the invention of more efficient machinery, or by a change in the consumers' utility curves.

### *Capital*

Capital is a collection of stocks of commodities possessing immediate utility, *i.e.* of commodities required for sustaining laborers in any kind of work. The word capital has been used in many other senses. Capital is created by *saving* commodities, by allowing production to exceed consumption.

Capital becomes reproductive through the exercise of man's inventive faculties. A portion of capital is consumed in making the *instrument* (or machine), which increases the efficiency of labor. Capital may be used in this way to assist the production of any commodity whatever. The excess

of production due to the employment of capital is called its *return*. Example. A man, by plucking wheat, saves a stock of it (capital) sufficient to support himself whilst he makes a sickle. The rate of return is measured by the amount of wheat per day which he can gather with the sickle beyond what was possible with his hands alone, *less* the wheat which he consumed in making the sickle spread over the number of days the sickle lasts. Capital is said to be *fixed* or *invested* in the sickle.

The reproductive character of capital makes it generally desired. Hence it is readily bought and sold. It is also very frequently hired. In the case of capital, not the original commodity, but an equal quantity of the same commodity newly produced, is returned. The hire is called *interest*, and the rate of hire paid per cent. of money lent is called *rate of interest*, which is subject to the law of supply and demand. Both the supply of, and the demand for, capital are essentially variable. Risk of loss entails higher rate of interest as compensation. Rate of interest is uniform, to whatever purpose the capital is applied, if risk be eliminated.

### *The Money Market*

The ease with which money is exchangeable for the necessities of life, renders it *potential capital*

Hence money, rather than goods, is usually lent, returned, and paid in interest. Demand for capital becomes a demand for pecuniary, and a nation's stock of pecuniary varies not only with its stock of capital, but also with the amount of credit and the balance of foreign trade.

### *Investment of Capital*

The general demand for capital makes it possible to obtain interest continually on the smallest amount. Hence capital, not immediately required, should always be lent. *Amount of investment* is the product of the quantity of capital invested multiplied by the length of time during which it remains invested. Interest is proportionate to amount of investment, hence the period of investment should always be reduced to a minimum by securing at the earliest possible moment a return from the instrument, which may be used to refund the capital. The delay in finishing great works (*e.g.*, Panama Canal) involves enormous waste.

## VI

### RENT

#### *Definition of Rent*

A FAMILIARITY with the conception of hire, and with the conditions which determine rate of hire, renders the study of rent a matter of simplicity. Notwithstanding the attempts of some modern economists, to widen the meaning of the term, the word *rent* will be used here in the sense which prevails in ordinary speech—that is, to denote money which is paid to the owner for the use of a house or a piece of land. In other words, we may say that *rent* is the hire paid for the use of the two commodities—land and buildings.

#### *Economic Nature of Buildings and Land*

Buildings and land are to be regarded as commodities, for they fulfil every condition of the

definition of a commodity: yet, in a sense, they differ from other commodities. This is so, because no two houses, and no two pieces of land, are exactly similar to one another. In the strictest sense, indeed, every house, and every plot of land, must be regarded as a separate commodity. Pieces of land differ from one another, if not in fertility, then in suitability for building: they differ also in situation, such as accessibility to a river, or perhaps in distance from the nearest tramway stopping place, or railway station.

For many purposes, however, different buildings, and different plots of land, may be classed together if they have certain qualities in common. For instance, in every town, many houses may be found which differ only a little from one another as regards accessibility to a railway station; or in healthiness of situation. Many kinds of agricultural land differ only a little from one another in regard to fertility or water supply. In practice, a man desiring to rent a house will have a certain kind of house in his mind, and will be ready to take any one of a number which have nearly the same advantages.

### *Factors Determining Rent*

Rent is fixed exactly as is the price fixed which is paid for any article purchased: that is to say, it

is determined entirely by the demand for, and supply of, buildings or land of the same class as those desired by the hirer. If a large number of houses of a particular kind be built in one locality, the supply of them is increased, and rents of that particular kind of house will fall. On the other hand, in any place where little building has taken place for many years, the supply of houses may fall short of the demand, and rents will be higher relatively to what they are for the same class of houses in other places. In the same way, in old and thickly populated countries, where there is great demand for agricultural land, rents will be found to be higher than in new countries where the demand for land is less.

Whilst the rent of a particular house, or plot of land, is certainly determined by the demand for, and supply of houses or land with the same advantages, we shall not have decided exactly how rent is fixed unless we discuss in some detail what are the advantages of houses or land which make one plot, or one house, to be more desired than another. Before considering this question, however, it may be worth while to mention that the causes which fix the rent of a house determine also its price: the price, in fact, varies proportionately with the rent. Supposing the interest on his capital demanded and obtainable by a landlord to be always the same, the price of a house would always bear

a fixed ratio to its rent. For instance, if the tenant had to keep the house in repair, so that rent was paid solely for the use of the house, and if the current rate of interest on loans entailing the same element of risk as house-lending were 5 per cent., the price would stand to the rent in the ratio of 20 to 1. The price would then be commonly said to be 'a 20 years' purchase.'

The differences of buildings, which determine the differences in demand for them, are so obvious that they need hardly be discussed. Buildings differ from one another, not only in size, but in the convenience of arrangement of their rooms and offices, and in their present state of repair. The differences depend, therefore, chiefly upon the original plans of the architect, but also partly on the amount of the annual expenditure in making good deterioration.

### *Differences of Urban Land*

The differences between different plots of land are of a more complicated character than those between buildings. Considering land in towns and their neighbourhood first, we find that urban sites differ from one another: firstly, in regard to situation—that is to say, in convenience as regards the places where persons are constantly wanting to go; secondly, as regards healthiness; and thirdly, as

regards suitability for building—the erection of a house being naturally more expensive upon an undulating or insecure foundation, than upon a level surface

### *Differences of Agricultural Land*

In considering the differences between different plots of agricultural land, we must remember that land so called is generally made use of for the production of food, tobacco, or some other commodity. Agricultural land is to be regarded, therefore, as an instrumental commodity; but it differs from most instrumental commodities in the fact that it is fixed in one position—it cannot be moved from place to place should the owner desire to dispose of it.

All land is not of equal *fertility*, that is to say, it has not always the same efficiency as a producing instrument. To put the matter more definitely, we may say that the amount of produce obtained for the same amount of work expended upon different kinds of land is not always the same. Obviously, that land will be most in demand from which a maximum of produce is obtained with the least work.

Different plots of land also differ from one another in distance from a market where the goods produced may be sold. In mediæval times, and, indeed, until about a century ago, the accessibility



of the market was not of the vital importance to the farmer which it is at the present time, because in those days a farmer was satisfied if his produce were sufficient to support his own family, and leave a little to be sold in the nearest village. To-day, however, when the scale of living is greatly advanced, a farmer wishes not only to produce enough to support himself and a few villagers, but also to sell much of his produce—perhaps by far the greater part of it—for shipment to distant markets. It is the price he obtains for this produce, less the cost of transport to market, which is, therefore, of vital importance to him.

### *Law of Diminishing Returns*

The properties of agricultural land will be more clearly understood, if we consider the effect of the application of successive portions of work to a given plot of land. The term *work* was explained in the essay on Labor, but it may be as well here to make clear the connotation of the term in this connection. It is taken to include *all* expenditure of effort with the object of production from the land, not only in ploughing, sowing, and harrowing, and in watering and manuring the soil, but also in obtaining the water supply, and in the manufacture of the fertilizer. In practice, the farmer buys his machines

and his manures from someone else, who has expended work in their production. In our theoretical abstraction, however, the work which the farmer is taken as applying to the land is not only his own work, but also the work of every man who assists him, and, in addition, the work necessary to produce the various implements and manures which he buys to use in raising produce from the soil.

Unfortunately, a practicable economic unit of work has not been devised as yet; and it is necessary, therefore, to assume here some unit, however crudely it may be defined, if the discussion is not to be of a purely abstract character. Let us, then, take as our unit—as what we may call one portion of work—the amount which an average farm laborer could do in one day working with hand tools. The stipulation that he use hand tools is necessary, because of the very varying efficiency of different machines—it is obvious that a man working with a machine may do several of such portions of work in a day.

The result of the application of one portion of work to a unit area of land—say, one acre—would be to reap no harvest at all. The application of several portions of work is necessary before any return can be expected from the land. After the expenditure of a few portions of work, say 15, a small harvest might be reaped in good time; but if a further expenditure had been made, of say 20

portions of work, a larger harvest would have been reaped. It is found, in fact, that the expenditure of additional portions of work tends at first to yield produce in a greater proportion. That is to say, an expenditure of, say, 30 portions would produce more than twice the harvest produced by 15 portions. As more and more work is expended upon the same plot of land, however, the harvest still increases, but the proportion of increase tends to fall off. For example, a third 15 portions of work would produce

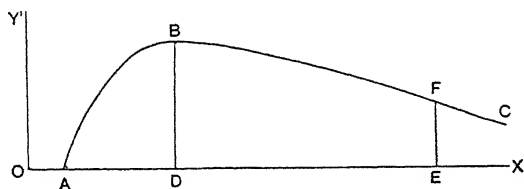


Fig. 38

less than did the second 15 portions, and a fourth lot of 15 portions would produce still less. As more and more work is applied to the same plot of land, so does the extra yield due to each additional portion tend to diminish. This fact, which is frequently spoken of as the *law of diminishing returns*, can be easily illustrated in diagrammatic fashion.

In fig. 38, let distances along OX represent the number of portions of work applied to a given plot of land; and let distances measured vertically in the direction OY represent the amount of additional

produce obtained for one extra portion of work. The curve ABC may then be drawn, showing the amount of produce which is actually obtained for each increment of work. The curve, it will be seen, rises from the line OX some distance to the right of the point O, which means that no harvest at all is obtained until several portions of work have been expended. Then it rises rapidly to the point B, showing that the expenditure of the next few portions of work means an increasing proportion of return, and after B it falls slowly (but continuously) showing that the application of yet more work always produces less and less result. A very little consideration shows that the law of diminishing returns must be true, else it would be possible, by expending more and more work upon a single plot of land, perhaps only a few acres in extent, to feed the entire population of a country, exactly as we could if food were made in a factory.

### *Degree of Fertility*

In the case which we have just considered, it will be convenient to designate the amount of produce which is obtained from a plot of land of unit area by the application of a portion of work as the *degree of fertility* of the land for that portion of work. More definitely, we may say that the *degree of fertility* of a plot of land is the amount of produce

which unit area yielded from the expenditure of the last small portion of work.

For instance, in fig. 38, after the expenditure of the amount of work represented by OD, the degree of fertility was DB; and after more work represented by DE had been applied to the land the degree of fertility—that is, the amount of produce now obtained by the addition of one more portion of work—was reduced to EF. It is only stating the law of diminishing returns in another way, if we say that the degree of fertility of a given piece of land is constantly altering with the amount of work already expended on it, and always ultimately diminishes.

Different kinds of land vary very much in the chemical composition—and therefore also in the agricultural properties—of their soils. There is the soil of stiff clay, and that of light calcareous clay; there is granite soil, basalt soil, and there is alluvial soil—usually the richest of all. It is easily understood that different kinds of land, differing as they do in the nature of their soils, as well as in other natural advantages, such as rainfall, shelter from storms, and the like, possess very different curves of fertility. In some cases the curve rises quickly to a maximum and then falls away slowly, showing that a high degree of fertility is reached with the expenditure of but little work. In other cases the curve rises very slowly and a maximum degree of

fertility is reached only after the expenditure of a great amount of work.

The factors which control the degree of fertility of any piece of land are now clearly seen to be two. In the first place the degree of fertility depends upon the natural state of the land—the character of its soil, and so forth; in the second place, upon the quantity of work which has been already expended upon it. Hence, a poor quality of land on which much labor has been expended may have the same degree of fertility as the best land upon which only a very little work has been expended

## VII

### PRODUCTION

#### *Produce of Combined Labor*

IN a previous essay on Labor it was pointed out that the very advantageous practice of division of labor necessarily entails a more or less organised combination of labor. A brief description was given of the various methods in use of combining divided labor; and enough was said to show that factory organisation has become a highly technical subject.\* It is not the aspect of the combination of labor which will concern us here, however. In this essay we shall seek an answer to the following question: How is the produce which is the result of the work of several people to be distributed between them as a reward for their labor? It is precisely upon this question that the

\* The description referred to is not published in this collection of Essays.

ever-recurring disputes between capital and labor hinge.

### *The Agents of Production*

A few preliminary inquiries are necessary before the investigation of distribution of produce can be undertaken. Different persons contribute labor and property of different kinds for combination; and, inasmuch as distinct functions can be recognised, these persons, four in number, may well be denoted by the term *agents of production*.

In the following pages, the functions of the various agents of production will be investigated first, after which we shall be free to consider the nature of the produce to be divided between them, and then to consider the variations in the quantity of produce available for distribution. We shall then be in a position to attack the main question—the proportions in which the produce is divided between agents of production, and the nature of the variable factors which determine these proportions.

### *The Enterpriser*

A scheme for combined production must originate in the mind of some person; and somebody also is required to organize it and to take the risk of his labor being wasted. These different functions



are usually combined in the same man. An idea occurs to a man, who is not well satisfied with his present employment, that there is money to be made in the manufacture of some article—it may be a new invention, or it may be a well-established article of commerce now transported from a great distance. He estimates the probable demand, in a neighbourhood which he selects, for the article in question, at various prices at which it might be possible to manufacture it; he next makes an estimate of the probable cost of production; and, if the probable proceeds show a sufficient margin above the cost of production, and the business is likely to prove profitable, he feels himself free to do his best to inaugurate the undertaking.

It will be well to designate a man who thus ventures on any new scheme of production by some descriptive term. For this I propose the old English word *enterpriser*, one which was formerly used to denote any person starting upon an adventure or enterprise, but has now fallen into disuse.\* The word has already been occasionally used by writers on Economics in much the sense which I shall here give it;† but it has not yet found a place in the textbooks of the science. The only English word which has been used with the same meaning is *undertaker*,

\* See Murray's English Dictionary.

† e.g., Weeden, Social Law Labor, 1882, p. 32.

but this word, though very expressive of the economic meaning, also bears a somewhat incongruous suggestion. The French synonym, *entrepreneur*, has been largely used by English writers, and a German term *unternehmer*, occasionally. It seems to me, however, very desirable that a suitable word, not presenting difficulties of pronunciation to those unacquainted with foreign languages, should be adopted.

### *The Capitalist*

At the present time little can be done in the way of production without the previous preliminary expenditure of capital upon the instruments of production—upon factory buildings and plant. Sometimes the amount of capital required is very great. Capital is also required in order to start the working of the factory, because, although, after a few months' working, the expenses of production are met by the sale of the products, at first it is necessary to meet them wholly out of the capital. The first business of the enterpriser, then, is to find a possessor of capital who is ready to invest it in the undertaking. The name *capitalist* is applied to any such person; and it may be well to state clearly that the term is here taken to include only possessors of capital, not the borrowers and users of capital.

In practice it is very common, when the factory to be established does not require the investment of a very large amount of capital, for the enterpriser to find a man possessing sufficient capital, and for the two to become partners. The former is an active partner, the latter merely a sleeping partner, who sometimes takes a definite proportion of the profit, but very frequently is paid a fixed interest upon the capital which he invests in the business.

### *The Landowner*

If a capitalist has been found willing to risk his money in the undertaking, the enterpriser's next business will be to find a suitable site upon which to build his factory. Having selected the site he will approach the owner of it with a view to either purchasing it or renting it. Let us suppose, as will often be the case, that he prefers to rent the land; the land-owner then becomes a party to the undertaking and may be called one of the agents of production. If the land be purchased, however, the enterpriser simply becomes his own landlord, and two of the agents are merged in the same individual.

### *Investment of Capital*

Having obtained capital and land, the enterpriser will now invest his capital by arranging for the erection of the building by contract and purchasing the necessary machinery, or by employing labor under his own control to carry out this work. It should be noted that, if the former course be adopted, money must be paid away equivalent to the remuneration of the services of a man capable of directing the work of construction as efficiently as the enterpriser could have done it himself.

### *The Laborer*

The factory being built and fully equipped, the next business is to obtain suitable workmen who are to do the actual production. The workman or *laborer*, then, is the fourth agent of production. The term *laborer* is sometimes conveniently applied in a collective sense, to signify, not a single workman, but any body of one or more workmen, who are in relations with an enterpriser. The context will show whether the word is used in the individual or collective sense.

### *Combination and Subdivision of the Agents amongst Individual Persons*

Whilst the functions of the four agents of production (the enterpriser, the capitalist, the land-

owner, and the laborer) can always be distinguished in every undertaking, it is very frequently found that two or more of them are combined in the same individual; or, on the other hand, that one is divided among a number of persons. For example, the village blacksmith certainly combines the agents of enterpriser and laborer, and generally of capitalist, because he will usually own his forge and tools; and he may also be the owner of the land on which he carries on his business. Municipalities very frequently not only direct their undertakings, but own any land on which their buildings are erected; and, in some cases, when they supply the necessary capital out of the rates, they must be regarded also as capitalists. If they are obliged to borrow the capital, the lenders are collectively the capitalist. The fourth agent, the laborer, is always separate.

A somewhat interesting example of the combination and division of the functions of the agents of production is to be found in companies. The shareholders who subscribe the necessary capital and take the risk of its loss, who possess also some share in directing the policy of the company, are to be regarded as the capitalist, with some part of the functions of the enterpriser. The chief part of the labor of the enterpriser is, however, in such cases, usually delegated to a Board of Directors, and to a salaried manager. The

shareholders may or may not be the land-owner; but only in case of co-operative companies are they also the laborers.

A close analysis of modern industrial undertakings would show a very complex arrangement of the duties of the four agents of production; but it is never difficult to distinguish their functions and discover how they are combined. It may be well at this point to make clear that there is no economic difference between a limited liability company and one which accepts full liability for its debts. Economically, any creditor of an undertaking may be regarded as a capitalist having a share in the enterprise. The economic difference between companies of full and limited liability is that, in the case of the latter, the risk of the creditor losing his money is greater than in that of the former. We might therefore expect that, whilst the amount charged for purchases on credit to companies of all kinds, as well as to other persons, would always be greater than that charged for cash purchases (the difference being an allowance of interest on the deferred payment), the amount charged for credit to a company of *limited* liability would be higher than to one of *unlimited* liability, in order to compensate for the greater risk of total loss.

*Nature of the Product of Labor*

In considering the division of the produce of combined labor amongst the four agents of production, attention must be directed to the fact that it is utility, or the power of obtaining pleasure, rather than the produce itself, for which a man labors. In *society* money is a means of purchasing whatever a man desires, so that the most convenient method of acquiring utility is to sell the produce of his labor. When we wish to speak of the produce in terms of the amount of money for which it is sold rather than the actual output of goods, we shall find it convenient to speak of *money produce*.

The determination of the proportions in which the money produce is to be divided, which includes the fixing of wages, is not made daily, but for longer periods of time. The rate of production is seldom uniform. It must be varied in consequence of changes in the supply or demand of the article produced, and may often vary with the price of raw material, or be interfered with by damaged machinery, or other causes. Again, in some occupations results are dependent on the seasons, and a harvest is gathered only once a year. Men therefore look forward sufficiently far not to base the distribution of produce on the results of a short period of days or weeks, but on those of a longer time, say, of a year.

*Variations in the Amount of Money*

The amount of money for which a year's produce is sold (I am careful not to say the price of a year's produce, because price is a ratio, and sales are effected at different times throughout the year) is constantly varying; and for three reasons. In the *first* place, the actual quantity of the produce may vary, as frequently occurs, for example, in the agricultural industries, and to a lesser extent in the manufactures. In the *second* place, there may be a variation of quality, which is really equivalent, so far as the consumer is concerned, to the making of a different commodity. An article of inferior quality will either not last so long, or not please so much as a similar article of the best quality; hence, when recognised, it always commands a lower price than the latter. Variations of quality are almost unavoidable in agriculture; and in all branches of production they may occur, either by improvements of methods, and increased vigilance, or by negligence and insufficient training of workmen. In the *third* place, the price at which the produce is sold is constantly changing, even if its quality remain absolutely the same. The changes of supply and demand are responsible for this variation of price, and it seems almost impossible, under the existing commercial system, that the supply and demand of



the majority of commodities should ever be adjusted to one another over any lengthy period of time

It is interesting to note that there is a beneficent action of the law of supply and demand, tending to counteract the effect of variation in the quantity of the harvests due to variations of the seasons. When the yield is meagre the price is increased, so that the total of money for which the crop sells is not far from equalling the amount for which it sells when the yield is abundant and the price consequently lower.

### *Net Money Produce*

Where production takes the form of manufacturing, that is to say, the conversion of one commodity (raw material) into another (the finished article), the variation in the price of the raw material is an important factor requiring consideration. To a certain extent changes in the price of raw material may be dependent upon the variations of the price of the finished article; but to a large extent they are due to independent circumstances. It is evidently not so much the *gross money produce*, as we may call the total revenue earned by a factory, which is of importance to the agents of production, as the remainder of the money produce, after the cost of the raw material, and one or two other items, have been paid. This remainder it will be convenient to call *net money produce*

Stated concisely, the *net money produce* may be defined as the gross money produce less all those expenses of production which are not, in any way, the reward of services employed in the production of that produce. If the nature of these expenses of production be analysed, we shall find that the chief one is the cost of the raw material. The next, and still a very important item, is a sinking fund, or an annual amount of money, saved at such a rate as, it is estimated, will have replaced the cost of plant used in the manufacture by the time it is worn out. Such provision for the restoration of capital does not, unfortunately, always find a place in the accounts of Government undertakings, but occupies a prominent place on the balance sheet of every sound commercial enterprise. A third item of expense which must be deducted from the gross produce is the insurance on the buildings and the plant contained in the factory, and on the stocks of both the raw material and manufactured article on hand.

### *The Distribution of the Produce*

The manner in which the net produce is distributed between the agents of production is of considerable interest. It will be convenient to consider the shares obtained by the capitalist, landowner, laborer, and enterpriser, in the order in

which they are here enumerated. The capitalist requires interest upon his money. This may be at current market rate, as is frequently the case when money is advanced by financial institutions; or the rate of interest may be a fixed one, as in the case of a partnership, or of preference shareholders of companies, or of the subscribers to municipal loans.

The interest which the capitalist receives is usually not solely the rate of hire for the money lent. Were it so, the law of indifference would necessitate interest upon capital embarked in all manner of enterprises being the same, which is notoriously not the case. The preference shareholders in one company may get 7 or 8 per cent; in another they may be offered  $3\frac{1}{2}$  or 4 per cent. The explanation of this fact is simply that the risk of loss of capital is much greater in some undertakings than in others, and the capitalist therefore requires, in addition to the interest on his money, an annuity (or small annual payment) as compensation for the risk of loss, which in ordinary business is indistinguishably merged with the rate of interest.

The land-owner requires rent for his land. The rent of the land depends in some degree upon the shares claimed by the other agents of production, as will appear from considerations to be stated in the next section; but the chief factors in determining it may be independent of the particular kind of

production with which it is connected, namely, such as have been stated in the previous essay.

The share received by the laborer may take one of three forms, firstly, a money payment at a fixed price, generally called *wages*, or secondly, a fixed share of the produce; or thirdly, a combination of both. The term *wages* is sometimes used loosely to include all these methods of remunerating labor, but it will be well in this essay to restrict it to the use here defined, the term *profit-share* being applied to any remuneration which takes the form of a division of produce.

Wages may either take the form of a bargain between the enterpriser and the workman for a payment of so much money for so much work done, which is usually called *piecework*, or of a contract in which the laborer agrees to do specified work for his employer for a definite price per hour, or other unit of time, which is the ordinary method of *time-wage*. Economically, the bargain in the latter case is of exactly the same nature as in the case of piecework, because there is a tacit understanding, sometimes a direct expression, of the duty of the worker to work at not less than a certain rate of production.

In actual practice, the methods of paying wages, or of dividing profits, are exceedingly various and complicated, and it will be more satisfactory to postpone a detailed discussion of them until the

theoretical aspect of the question has been, considered.

The share obtained by the enterpriser is merely the remainder which, at the moment, is the balance of produce after the claims of the other agents are satisfied; what, in common parlance, is usually called profit. Here, it will be convenient to designate this remainder *gross profit*

Evidently the enterpriser's remuneration tends to be less stable than that of the other agents. It must fluctuate from month to month in accordance with the state of trade and of the expenses of conducting the manufacture or other form of production. He thus stands to gain much or earn little—sometimes nothing—by his labor. In the long run, that is to say, in periods of a few years' time, the portion which the enterpriser considers necessary to compensate him for his labor, and the risk of its suddenly becoming unremunerative, has a partly determining influence on the remuneration of the other agents. The manner of this inter-action will be clearly explained in succeeding sections.

Many authors subdivide the enterpriser's portion into three parts, namely: wages of superintendence; compensation for risk of loss of employment and possessions; and the remainder, or profit in a restricted sense, often nil. The wages of superintendence are taken at an amount equal to the salary which it would be necessary to pay a

manager who should be able to do the necessary work in supervising the processes of manufacture with the same degree of skill as is exercised by the enterpriser himself. This will usually be the principal item in the gross profit. The second part is simply an annuity which we may suppose graduated so as to afford equitable compensation for the risk incurred of occasional loss of the wages of superintendence, of a possibility of a total failure of the undertaking, and of liability to seizure for debt of the enterpriser's personal property, in addition to that already invested in the enterprise. In the case of a limited liability company the risk involved is solely that of the loss of the capital invested in the company. The enterpriser's risk is much greater in the case of undertakings which place some new invention upon the market than in the case of well-established articles of commerce.

Profit, using the term in its restricted sense, is probably the exception rather than the rule. It is only in newly-established industries, as cycle-making was a few years ago, and in monopolies protected by patents, and in some other ways, that profit *sen. strict* can be made. Any trade in which such profit is being made at once attracts the attention of would-be enterprisers. The competition which they initiate in the production reduces the selling price in greater degree than it reduces the cost of production, until the gross profit becomes reduced to a level, at which

it will cover only the wages of superintendence and enterpriser's compensation for risk.

In ordinary business it is not by any means always the custom to distinguish between what we have here recognised as the component parts of the gross profit. A portion is often earmarked as manager's salary, though it goes with the remainder of the gross profit into the enterpriser's pocket; but little notice is taken in a firm's books of compensation for enterpriser's risk.

### *Causes Determining the Relative Shares of the Four Agents*

The problem of the actual determining influence in the distribution of the produce between the four agents of production at any given time must now be attacked. It will be found that the distribution depends upon complicated actions and re-actions of the law of supply and demand. For the sake of clearness let us repeat the conclusions expressed by this law which are summarised in the essay on Exchange. It was found that, if the demand for a commodity be steady and a supply offer in excess of the demand at the existing price, the price must forthwith fall; and vice-versa, if the supply fall off at the existing price, the demand remaining steady, then the price must rise. On the other hand, if the

supply be steady and the demand change, an increased demand will raise the price, and a decreased demand will lower it.

Reverting for a moment to the manner in which an enterpriser initiates an undertaking, we find that it is he who makes a bargain with each of the other agents of production. Now, each of these 'bargains' is subject to the action of the law of supply and demand. If the supply of one agent increase, the price at which his service is engaged will fall. Then there will be so much the more produce to be divided among the remaining three agents. Should the supply of one agent decrease, a higher price must be paid, before his service can be enlisted, and there will be so much the less for the others. Should the general demand for the service of one of the agents increase, as for instance for the capitalist's service, his share will be raised, and all the others will get less. If the general demand for his service decrease, the others will get more. It is therefore clear at once that an increase of available capital, meaning lower interest, results in increased wages, greater profit to the enterpriser, and, in the long run, higher rent.

Variations of rent usually take place less easily than changes in the shares of the other agents, because of the prevailing custom of making leases for a number of years. A tendency in the direction of lowering, or raising, the rents is always produced



by changes in the supply of, or demand for, the other agents; but it requires a considerable accumulation of such tendency, if the phrase may be allowed, actually to effect a change of rent. It is like a body with great inertia, moving only with a strong push.

A change in the supply of, or demand for, labor exercises a comparatively rapid effect upon the share obtained by that agent, and, indirectly, therefore, also upon the shares of the other agents. If the requisite labor become scarcer, the wages paid must very soon be raised. At first the enterpriser alone will suffer; but soon the capitalist must accept lower interest, or take his money elsewhere; and the landowner must lower his rent, or terminate the lease.

The effect of changes in the supply of land may not be altogether so clear. In the essay on Rent it has been explained that a virtual change in the supply of land is effected when new land of the kind in demand is opened up by means of new railways, tramways, or other means of transport. Let us suppose, then, that a large area of land suitable for factories has been newly placed in convenient communication with the great centres of population. Enterprisers seeking land for the establishment of new factories, or the removal and enlargement of old ones, find a much greater range of choice before them than of old. The advantage of the bargain is on their side. At the same time, the owners of the newly opened land obtain higher rents than they

did before; but the class of landlords who previously owned sites suitable for factories, or land on which factories already stood, and who, in the latter case, therefore, were agents of production, now obtain less rent than they did, or could have done, before. The shares of the net produce falling to the other agents are correspondingly increased.

*Increase in the Demand for, and Supply  
of, Enterprisers' Services*

If the effect of changes in the supply of, or demand for, capital, land, and labor on the shares of the other agents has been grasped, little difficulty will be experienced in seeing that in the long run the supply of, or demand for, enterprisers in any particular industry must influence the shares of the other three agents. A new industry, as for example bicycle-making, originates in one factory established by the inventor. As soon as the new commodity is on the market and is found to be selling well, a few of those persons who are ever on the lookout for some more profitable mode of employing their energies instantly realise their opportunity. Should the new invention not be protected by a patent, they are able at once to consider whether they could make a satisfactory profit by manufacturing it. If it be protected, they will require to know the amount

of the royalty which they must pay for the use of the patent. Then, if the amount asked be not so high as to prohibit any idea of manufacturing at a profit, they will consider whether the profit which they estimate would be realised would be an adequate reward for their labor. There is little growth in an industry until it is freed from a monopoly of patent by the effluxion of time, and we will take up our story at the time when the patent runs out. Any man so disposed is then free to start a business for the production and sale of the new commodity; and he will do so if he think it worth his while.

Let us suppose that, as is often the case with modern inventions, the commodity in question calls for considerable scientific and technical knowledge in any one who would undertake to design plant for its economical manufacture, and to direct the operation of the plant. At the time there will only be a few persons with such qualifications in existence, who are at the same time seeking occupation. They will establish a few factories, say six or seven. Before these are in working order, the firm founded by the owner of the patent has been making enormous profits by selling the commodity at a price far above its cost of production, perhaps two or three times as high. The newly started factories can therefore offer their products at a great reduction of price, whilst yet maintaining the price far above the cost of

production, because the demand of the public for this new commodity will be stimulated by a moderate fall in price sufficiently to keep all of the factories working full time. The result is that the gross profits of the enterprisers in the industry far exceed their due wages of superintendence and compensation for risk; they are, in fact, drawing a large profit (in the restricted sense)—what is frequently known as speculative profit.

As time goes by, other men with suitable qualifications consider whether they might not profitably undertake the manufacture of this commodity. Not infrequently they are sub-managers, or even foremen, of the already-established factories, who have some idea of the enormous profits being made by their employers, and a technical knowledge of the processes employed. These men start other factories in competition with the existing ones; and the increased supply of the commodity means that its price must fall if it is to be sold. New factories are started so long as there seems any prospect of profit above the remuneration which the would-be enterpriser, with his skill, could obtain in any other employment. The starting of new factories stops, and also the fall of price of the finished article, when the supply of the commodity has overtaken the demand of the public for it, as we might say. The commodity can then be sold only at a price which is so low that, after paying for the cost of production,

there is left as a remainder only just sufficient to provide the enterpriser with his wages of superintendence and a margin of compensation for risk. The industry has now reached a stable condition, in which new factories will not be started, nor old ones extended, except to keep pace with the growth of population and increase of general wealth. Such is the state of the cotton and woollen manufactures, and many others of the oldest industries of Great Britain.

The example just considered illustrates an increase in the demand for, and supply of, enterprisers in any particular industry. As the new article grows in public favor, and the existing factories make larger and larger profits, the demand for enterprisers in that industry may be said to be increasing. Following upon the increased demand, the supply gradually increases as new factories are started, until, in a few years, the stable condition of the industry is approached, and the demand for enterprisers' services practically ceases to increase.

It is evident that the result of such an increased supply of enterprisers' services is to diminish the share which that agent obtains. At the same time the shares obtained by all the other agents of production are proportionately increased. As the demand for capital and land increases there is a slight, but probably imperceptible, increase in the rate of interest and in rents—the shares of the capitalist and

land-owner. An increase of rent is perhaps only likely if many factories are being started in the same district; but this is not an infrequent occurrence, as witness the establishment of bicycle factories at Wolverhampton and Coventry, or the marvellous growth of the cotton trade in Lancashire.

The starting of so many new factories demanding special skill in the workers means a decided increase in the demand for laborers. If, as is usually the case, a supply of such with the requisite skill and training be not immediately forthcoming, a higher rate of wages is offered by all the enterprisers, one after the other, in the hope of inducing men either to leave other masters in the same industry, or to change their trade. Thus the laborer's share also is increased.

### *Decrease in the Demand for Enterprisers' Services*

When an industry is growing, there is, as we have seen, an increase in the demand for enterprisers' services. We shall find, on the other hand, that when an industry is decaying, there is a condition of stagnation and failure set up, which amounts to a decrease in the demand for enterprisers' services. To render our investigation definite, let us suppose that some manufactured article is gradually going

out of use, being supplanted by a new invention,—as the Argand burner, for instance, has given way before the incandescent gaslight, or wooden ships have been replaced by those of iron and steel. We shall then be able to trace the results of a decreasing demand for the article in question, as it affects first one, and then the others of the agents of production.

In any industry consisting of several separate factories, there are sure to be different degrees of skill manifested in the management of the works and the commercial business. The result is that the gross profit is large in some of the factories, moderate in others, and small in the rest. In the first group there may be a considerable profit in the restricted sense; in the second, the gross profit may cover only the enterpriser's wages of superintendence and compensation for risk; and, in the third class, may be found many factories which barely earn for the enterpriser wages of superintendence sufficient for a respectable living.

If the reason for the great variation of the enterpriser's portion in different producing firms be sought, it will be found in the fact that the enterpriser buys the services of the other agents of production in the open market; so that for each he is obliged to pay the ruling market price, or very nearly as much. The truth of this statement will become clear if we devote the following few pages to investigating the nature of the markets for capital, land and labor.

*Market for Capital*

The market for capital is nearly perfect, and in interest pure and simple the enterpriser must pay exactly the current rate for loans of the term which he requires. If his demand affect the rate at all it will be in the direction of raising it slightly. The annuity to be paid as compensation for risk of loss of the capital, on the contrary, must always be the subject of an individual bargain between the enterpriser and the capitalist he approaches; and all the difficulty in the negotiation of an ordinary loan of capital lies in making this bargain. Hence a man owning little property which might stand as security, and having no record of achievements, will usually be handicapped from the start by having to pay a high compensation annuity; that is to say, by having to pay a rate of interest considerably in excess of the current rate on perfect security.

*Market for Land*

The market for the hire of land is much less perfectly organised than that of capital. This arises in part from the stationary character of the commodity, and in part from the fact that the different kinds of land—in reality different commodities—are not publicly classified under any



generally recognised system. Although there may exist something approaching a ruling price and rent for land possessing the same advantages, there is no quotation, even in large centres of population, for land of a certain class. Each contract for rent is really the outcome of an individual bargain, in which the stocks, and other circumstances of the parties, have full play. We may conclude, therefore, that different enterprisers may sometimes rent land of the same advantages at somewhat different rents: the poorest man, and the best bargainer, always paying the least rent, if the landlords be equally rich. Should they not be so, the rent obtained by a poor landlord will generally be less than that secured by the rich landowner in the same district, other things being equal.

### *Market for Labor*

The labor market is organised to a high state of perfection in some branches of employment. The unions, sometimes in conference with committees of the masters, fix current rates of wages in the different trades: and the unions, labor bureaus, and agencies, form the mechanism by which the offers of masters and men, buyers and sellers of labor, are made known to one another. In any well established industry it has become difficult for an enterpriser to obtain labor at a price below the market rate. The question how

For this is due to the organisation of the market, and how far to the controlling action of the unions, belongs properly to a discussion of wages, and need not be answered here. It may be noted, however, that were there no unions to exert pressure on those enterprisers making the least profits, the latter would probably obtain practically all the labor they require at a wage somewhat below the rate prevailing in the trade. In every trade there are numerous "outsiders," such as young or partially trained workmen, foreigners, clumsy workers, and men of bad character. These will always accept comparatively low wages; but the man who employs them must expect work of poor quality.

It will not be wrong to assume that in a well established industry under modern conditions all enterprisers must pay the same rate of wages. It is to their interest to do so, because of the heavy penalty by which usually they may be visited, if they attempt to pay less than the union rate. In a newly established industry, on the other hand, the enterpriser is able to decide for himself what wage is sufficient to attract enough workers of the requisite skill and intelligence, and he will pay no more. Workmen, however, are very quick to discover differences in pay for the same kind of work, and such freedom of action will not long exist

*Enterprisers pay Same Prices for Agents'  
Services*

The foregoing observations will have made it clear that, except for labor in industries in which the workers are badly organised, and except for compensation on risk of loss of capital, all enterprisers must pay the same prices for the services of the laborer and the capitalist. The exceptions are of little importance if, as is usual, the variations from the prevalent price are slight. For land, different rents per acre are paid; and this is due to two causes. In the first place different plots of land vary in their advantages for production, and transportation of material; and their rents differ according to their advantages, so that in the expenses of production a low rent is compensated by the greater cost of the carriage both of the raw material and of the finished article, and in other ways. In the second place, as already explained, there are real, though comparatively slight, differences in rent for land of the same advantages, due to circumstances affecting individual bargains.

*Decrease of Demand for Manufactured  
Article*

We may now proceed to consider the effect upon an industry of a diminution in the demand for the article which it manufactures. The first sign of a

change in the requirements of the public is a slackness of orders, accompanied by a growth of the manufacturers' stocks of the finished article. The stocks becoming too large, the firms making a large gross profit prefer to sell at a reduced price, and still make a fair gross profit, rather than seriously limit the output of their factories. These firms having lowered their price, all enterprisers are now obliged to sell at the reduced price, if at all. By this reduction prosperous firms may only be shorn of their profit in restricted sense; but those enterprisers who previously were but moderately successful, now find their wages of superintendence diminished; and those who before barely made a living now make no gross profit whatever, and will speedily get into debt and go bankrupt.

A sudden reduction of price sufficient to fail a number of firms is not a usual occurrence. More generally there is a gradual fall of price, because even a slight reduction gives a fresh stimulus to demand. It is whilst the price is falling that the demand for the service of enterprisers in that industry may be said to be decreasing. The result at first is to throw the burden wholly on to the enterpriser, apart from the other agents of production. He takes what at the moment is the balance of the net produce after the shares of the other agents have been paid, and so at first his share, relatively to that of the other agents, is

greatly diminished. In a little while, however, the fall of price reacts upon the shares of the other agents, and a complete readjustment of shares to the new conditions takes place. A detailed examination of the process of this readjustment may not be without interest.

### *Readjustment of Shares of Reduced Money Produce*

From the moment that orders begin to diminish, and the net produce begins to fall off, an enterpriser is naturally restless, and seeks to pass on part of the burden of loss to the other agents. Neither rent nor interest can usually be altered at a few days', or even weeks' notice, as the enterpriser is not generally in a position to move his factory to another site, nor to negotiate another loan on more favorable terms. He turns to his weekly wages bill, a very large item in the current expenditure of the firm, and anxiously considers whether he cannot reduce it somewhat. So long as the trade employs the usual number of workers, however, he cannot hope for relief in that direction. He does not care yet to risk the loss of good workmen, who might leave if he reduced their wages; nor to take the chance of a strike. The enterpriser's opportunity comes when two or three of the least successful firms

fail, and their factories are closed; whilst at the same time, perhaps, a few firms may be turning away some of their men in order to prevent the accumulation of too large stocks of the manufactured commodity. He may then with some confidence decide to make a new bargain with his laborers, because he knows that the supply of labor is now in excess of the demand at the existing rate of wages. He therefore gives notice of a reduction of wages; and the laborers are practically forced to accept it, or at least some measure of reduction. A strike could not have the remotest chance of success, because the economic conditions are against the worker. The circumstances are such that many enterprisers could not hope to continue production, and obtain any gross profit at all, without a reduction of wages; and the knowledge of this makes them ready to close their factories, rather than give way to the men and continue without a reduction. The reduction of wages is therefore certain to take place, either with or without a strike.

### *Summary*

A decrease in the demand for enterprisers' services we have found to be accompanied by a marked decrease in their shares of the net produce. A re-adjustment follows, in which the laborers' shares are reduced, and the enterprisers' to some extent

restored. Should the industry be a localised one, the failure of a few factories would probably lower rents a little, by rendering vacant suitable premises for surviving firms to occupy, should their landlords prove obstinate. The current rate of interest is not appreciably affected by events in a single industry; so that the capitalist still receives the same remuneration for his service, except in the case of those firms whose net produce does not suffice to pay the whole of the interest. Failure to pay interest in full is a common occurrence, and does not lead to bankruptcy when the capitalist is the enterpriser himself, or his partner, or the shareholders of a company.

The re-adjustment of the division of the reduced net money produce results in the four agents of production obtaining shares in very nearly the same proportion as they had before. Enterprisers, who can no longer make as good a living in this industry as, by some other employment, go elsewhere; and some workmen, whether dissatisfied with the reduced wages, or no longer able to obtain employment, turn to other trades.\* Thus there is an excess of supply

\* My friend Mr. Garlick informs me that he has learned from the foreman of a large engineering establishment that the depression in the engineering and ship-building trades in Sydney during 1904 drove many men to abandon those trades and seek a living in other employments such as boot-making (which means learning an entirely new trade), poultry farming, market gardening, and hawking.

of enterprisers' or laborers' services to be operative in reducing their respective shares; so that the latter now bear approximately the same ratio to one another as before the reduction of price. The share of the capitalist, being the same annual sum as previously, will, in the more prosperous firms, who pay interest in full, bear a somewhat higher proportion to the other shares than formerly; and the same is true of the landlord's share, unless the rent has been reduced.

### *Combination of Agents of Production in One Person*

The combination of two or more of the agents of production in the same person or group of persons has no essential bearing upon the decay of an industry. The enterpriser's remuneration decreases to the same extent, and the proportion of enterprisers who will find it unprofitable to continue in the industry will be the same. The only effect which such combination can have is to render actual bankruptcy less probable, for the enterpriser commits no legal offence by failing to pay himself interest or rent.

### *Periods of Temporary Depression*

All industries are liable to periods of temporary depression, during which there is but a sluggish



demand for the manufactured goods; and into the causes of which we need not enter here. The result of such depression is to force the enterpriser to one of two courses. he may either lower the price of the manufactured article, and thus stimulate the demand; or he may limit the output of the factory to what is sufficient to meet the existing demand at the old price.

### *Reduction of Price*

Should the former course of lowering the price be adopted, the net money produce is very much reduced throughout the whole period of depression; and the loss often falls wholly upon the enterpriser. As a period of depression may often last as long as two or three years, such a course would probably involve the failure of a number of firms, and would mean great loss for all. At first sight it would seem proper that during a period of depression the shares of each of the agents should be proportionately reduced, so that they might still bear the same ratio to one another as before. It will be understood, however, from what has been said in the last section, that the shares taken by the landlord and capitalist cannot be reduced at the enterpriser's will; and if any reduction is effected it is only after the lapse of a considerable period of time. The share of the laborer, on the other hand, may be reduced; and

this is often done, and yet more often attempted. The sliding scale in the coal trade, by which wages vary with the selling price of coal, is an example of an automatic arrangement by which the reduction is effected, the old wages being restored when the period of depression is past.

### *Restriction of Output*

On the other hand, should the latter method be chosen, workmen not required for producing the diminished output are turned off, so many each week, as the demand decreases. The price remaining the same, the net money produce is reduced in the same proportion as the demand; and the share of the laborers, taken as a body, diminishes again in the same proportion. The enterpriser's share is reduced to a greater extent, because there is no reduction of interest or rent. Much invested capital is indeed lying idle. For example, should the demand fall to three-quarters of what it was, nearly a quarter of the workmen will be turned away (a few doing special work cannot be dispensed with), so that, whilst the net produce is but three-quarters of what it was, the wages bill has been reduced to little more than three-quarters of its former self, and the enterpriser's portion, the gross profit, is perhaps about one-half or five-eighths of its previous amount.

*Enterprisers' View of Relative Advantages,*

In practice the two methods are often combined, a restriction of output not taking place until there has been some reduction of price; because manufacturers are loth to disorganise their staffs for what might prove, after all, to be but a very brief stagnation of business. In any case, restriction of output is rarely an advantageous course unless there be combination amongst enterprisers to avoid further reduction of price. If a few firms persist in reducing the price, those who have restricted output will themselves be doubly embarrassed. Restriction of output, assuring, as it does, some profit to the enterpriser, is a method with so much to recommend it, from the latter's point of view, that it is not surprising that combination amongst manufacturers, with a view to common action, is becoming increasingly common in a great number of industries.

*Best Method from Laborers' Point of View*

The unpopularity of the sliding scale, and the very numerous examples of disastrous strikes which have followed notices of reduction of wages, point unmistakably to the inconvenience which accompanies temporary changes of wages. Neither is there, from the employees' point of view, anything

more favorable to be said for restriction of output. The majority of the workmen remain unaffected by it directly, because they still receive the same rate of wages; but the minority, who are suddenly deprived of work, frequently endure much suffering, and make a heavy charge for their support, either upon their trade-union, or the community in general. The method of restricting output by working short time, say four days a week, is one which has much to recommend it. None of the employees need be discharged; and, although the weekly earnings of all are reduced, the fact causes little of that bitter feeling which is engendered by a reduction of the rate paid for the work done. The chief objection to the method as usually applied is that the men have two or three consecutive idle days each week which is a somewhat demoralising influence. A reduced working day, of say six hours, maintained throughout the week, is more advantageous to the workman, though probably, in most industries, more costly to the employer.

### *Best Method for the General Public*

It may be pointed out that, from the point of view of the good of the whole community, restriction of output is a wasteful practice. The energy of a number of men, which might be devoted to the production of commodities, is made no use of at all. If the other method, that of reduction of price and

concurrent reduction of wages be adopted, the consumer, on purchasing the manufactured article, gains the same amount of utility for less money, and is, therefore, in reality enriched. Hence men who work, when necessary, at a lower wage than that to which they have been accustomed, are conferring a benefit on the rest of mankind; that is, provided their reduction of wages is due to a lowered selling price, and not to a combination of manufacturers to limit output under the protection of a tariff.

### *Prevention of Industrial Depressions*

It is not possible here to discuss the question whether periods of industrial depression might be averted by any action of the producing and commercial classes, or by legislative pressure. Neither is this the place to discuss the steps which should be taken to ameliorate the distress suffered during such periods. A few words, however, will suffice to indicate the general directions which all economically sound attempts at such prevention and amelioration must take.

Periods of depression generally follow periods during which the consumption of the common necessities of life has equalled or surpassed the production of them; as during a war, or during such a period of speculative investment of capital in usable commodities as often follows upon a period of plenty. Periods of depression are times of

scarcity, both of money and of certain commodities. Hence the remedy must take the form of saving, either by individuals, or the community, during periods of prosperity. A saving of money in banks would have no effect, unless it were reserved from being lent out again; and an actual storing of commodities might have to be resorted to.

### *Problem of the Unemployed*

Amelioration of distress arising from scarcity of employment can only be obtained, with economic advantage, by individuals, or Government in its various forms, starting works to produce such commodities as are most urgently needed. Such works must be capable of being carried out by unskilled labor; they must be such as do not necessitate extensive investment of capital in instruments of production; and preferably such as would not commonly provide a return more than sufficient to pay interest on the requisite capital, were it invested in any such instruments. Thus whilst stone-breaking by hand admirably fulfils the first two conditions, it fails to satisfy the third; because that heartrending work can be more efficiently and cheaply done on a large scale by machines. It is thus a positive waste to employ large numbers of men in breaking stones with hammers. There is always much useful work to be

done, however, with no more costly instruments of production than the pick and shovel, and here and there a light locomotive and a length of tramline. In England, the construction of more direct and level roads is urgently needed; in Australia, the regrading of railways, and the construction of dams for impounding water.

A practical scheme for the improvement of English roads by relief work during times of depression might easily be evolved by a Royal Commission or a Committee of the House of Commons. The Commission having drawn up a uniform and harmonious programme of work, to extend perhaps over the industrial depressions which might be expected during a period of fifty years, the executive control could be handed to the county councils or district councils, as seemed advisable. Any such scheme would probably do harm, as well as good, unless it were distinctly recognised as relief work, and a somewhat lower rate of wages were paid than that normally prevailing for work of the same kind. The only difficulty in the way of its execution would be the provision of the money to hire the necessary tools and machinery, and to pay wages. Whilst public subscriptions might supply one-fifth or a quarter of the necessary money, the rest would have to be supplied out of consolidated revenue and by borrowing. The Imperial Treasury would be able to borrow money at a lower rate than the

councils, and might with advantage undertake the responsibility. Whether the large sums necessary could be obtained without unduly raising the current rate of interest is a matter requiring attention; for, though the rate is generally low during a period of depression, money is often scarce. The low rate of interest usually prevailing during periods of depression is attributable to the slack demand for capital which follows the destruction of public confidence in new enterprises.\*

Whatever means be adopted for solving the problem of the unemployed, it is earnestly to be hoped that the mistaken kindness of gifts, and the palliatives of boards of guardians and relief committees, may soon become things of the past. The mind of man has accomplished greater feats than to devise a plan whereby the surplus labor of industry might, as need arose, be absorbed in works conducted by some branch of government, and directed consistently to some really useful purpose. The execution of such a plan by the strenuous exertions of local bodies would indeed be the truest form of charity—that which saves pain in human hearts, and keeps men's homes intact.

\* After the matter of this Essay was finally prepared for the press, the author noticed in the King's speech opening the present (1905) Imperial Parliament a promise to introduce a Bill to establish permanent machinery for the relief of the unemployed. He has received no particulars of this interesting proposal.